The

Geographical Journal.

No. IV. APRIL, 1913. Vol. XLI.

EXPEDITION TO NORTH-EAST GREENLAND, 1909-12.*

By EINAR MIKKELSEN.

When the "Danmark" Expedition to Greenland under Mylius Erichsen returned in 1908, it brought back great and important results, together with the sad news that these had been purchased at the price of the lives of Mylius Erichsen, Hoeg-Hagen, and Brönlund.

When this became known, a movement was set on foot to raise funds for the sending out of an expedition to look for the papers of the ill-fated men, and I offered my services to the committee of the "Danmark" Expedition for the task. The committee accepted my offer, the Government gave its sanction, and a number of private persons contributed funds. On June 20, 1909, the expedition left Copenhagen on board the *Alabama*, a sloop of about 50 tons, built in Norway, but rebuilt and fitted out with motor in Copenhagen. We were seven in all—Lieut. Laub, R.N., Lieut. Jørgensen, R.I., Engineer Aagaard, the mates Olsen and Paulsen, and the carpenter Unger, besides myself.

After calling at Iceland, and encountering many difficulties with the ice off Greenland, at last, on the morning of August 25, we anchored off the southern point of Shannon island. After a few hours' rest, however, we put to sea again, it being our intention to try and reach Danmark Havn, where the Mylius Erichsen Expedition wintered in 1906-08, and where the expedition had left some houses and quite a store of provisions. This, however, we were unable to do, as the young ice to the north of Shannon island was so thick as to render further progress impossible. We were thus compelled, much against our will, to winter on Shannon island, nearly a hundred miles south of the

* Summary of paper at the R.G.S., January 13, 1913. Map, p. 420. For the use of the illustrations we are indebted to Mr. Heinemann, publisher of the narrative of the expedition.

point we had hoped to reach. This was on August 27. By September 25 the young ice was so thick that we could begin to think about making a sledge trip northward to Lambert Land, north of lat. 79°. This expedition was to be carried out by Lieut. Jørgensen, Engineer Iversen, and myself, Laub and Olsen accompanying us for part of the way. We had hoped to return by the middle of November; but the journey took much longer than we had expected, and it was not until December 17 that we reached the *Alabama*.

We were able to reach Cape Bergendahl on November 4. It was here that Brönlund was supposed to have died; and, after some searching, we discovered the body, buried in the snow. We found, however, nothing of importance in the way of results, Captain Kock having taken with him everything of any interest. From here we continued our way northwards in the hope of finding some traces of the others, but without result. We explored all that part of the coast where they might possibly have camped, but found nothing, and on November 8 we were forced to turn back, the darkness and lack of provisions making it impossible to go further.

On November 25 we reached Danmark Havn once more, having been thirty-eight days on the journey. Our teams had suffered very much; of the score of dogs we had taken with us, half had already died of fatigue, and as we were to use the rest for the further journey to the ship, we were obliged to make a halt here in order to rest and feed them. We gave them two hot meals a day, and at the end of three days they had apparently regained their strength.

We were now ready to start, but heavy storms made it impossible to move, and for six days we lay there waiting for fair weather. At last, on December 3, we set off, but the journey proved most unfortunate. Lieut. Jørgensen's feet became frost-bitten; we had more losses among the dogs, and had only six left when we at last reached the ship on December 16.

During our absence, Lieut. Laub had made several minor expeditions in the surrounding country, the ship had been got ready for the winter, the dogs we had left behind were in good condition, and all was as well as we could wish. We at once commenced making preparations for the real expedition, which we were to undertake in the spring, but there was much to be done, and it was not until February 17 that we were ready to begin sledging again. Lieut. Laub was the first to start—he was to go up with a load of 1500 lbs., getting as far to the north as possible, and making a depôt there, returning, however, before the end of February, as we were to start, if possible, on March 3. He managed to get as far as Bessel bay with the provisions, and returned in good time, so that all was ready on the appointed day. Unfortunately, Lieut. Jørgensen's frozen feet proved to be a more serious matter than we had imagined, and he was unable to take part in the sledging expedition. He and Unger remained on board, while the rest of us went northward in two parties. The one, consisting of

Iversen and myself, was to make the whole journey to Danmark fjord, while the other, consisting of Lieut. Laub, Olsen, and Poulsen, was to accompany us as far as possible. Owing to the few dogs available, the state of the inland ice, the frequent storms and other causes, our progress was slow. As we had a total weight of 3600 lbs. to carry and only twenty dogs, it was naturally impossible to take the whole load on at once, and we were obliged to make the journey by double stages. This very naturally made it a long business, and it was March 25 when we reached Dove bay, where we were to make the ascent on to the inland ice. Hitherto the weather had been good, but as soon as we got up on the ice-cap, it became stormy, blowing hard nearly every day during the six weeks which it took us to cross. This delayed us of course very much, and we were glad to get two days' sledging without having to lie up on account of storms. It was seldom we were so fortunate, however, and more than once we were forced to lie idle for three or four days together, waiting for the gale to subside. In addition to this, progress was rendered difficult by rough, bare and hilly ice, and as we had to cover each stretch of ground twice we had not got nearly so far as we had anticipated when the time came for our parties to separate. At lat. 77° 20′ N., we said good-bye to our companions, Lieut. Laub and his party going southward to make a journey round Queen Louise land, while Iversen and I continued our way to the north. This was on April 10, and we had now fuel and provisions for a hundred days, and fifteen dogs. As long as the ice was fairly good, the dogs could easily manage the sledge; but to begin with, the ice was so hilly that we made but poor progress, apart from the weather, which continued to throw difficulties in our way.

Hitherto the upward slope of the ice had been but slight, and our altitude was now only 2000 feet, while the ice had also been more or less free from fissures. Now, however, the ascent became steeper, and the surface was cut up by broad cracks. These cracks were covered with snow, so that it was impossible to see them, and the first warning we had of their presence was when Iversen's sledge fell through into one of them. Fortunately, however, the sledge hung fast on a point of a snow bridge which had remained there from the previous summer. From this point up to lat. 79½° N., we encountered these cracks continually. Simultaneously with the crevasses commenced the steep ascent, which was particularly noticeable during the days from April 18 to 22, when we came to a range of small nunataks, stretching from Pic de Gerlache to the northern point of Queen Louise land. These nunataks form a kind of barrier against the further eastward progress of the ice. The inland ice from the west flows partly out over these nunataks, but to the east of them it is at least 900 feet lower and there was nothing to be done but to try and get up on to the higher ice behind. After reaching the plateau, at a height of 4000 feet, the ice became much better, with but little or no ascent, as far as we could see. The hills were long and low, and caused us very little

difficulty. The cracks, however, now became worse, and there was scarcely a day but we were continually reminded of their existence. These cracks varied from 1 to 30 feet across. The broad fissures were naturally the most dangerous; we preferred them, however, to the narrow cracks, as the weight of the snow caused it to sink in the middle, so that we could see there was danger ahead.

After passing the Pic de Gerlache the ice improved, being now less hilly and with fewer cracks, and so smooth that the sledge ran much more easily than before. On May 8, 1910, we camped some 4 or 5 miles from the edge of the ice, and went forward to explore, hoping to be able to get straight down on to the land at once. This proved, however, to be a matter of considerable difficulty as the ice-cap ended in a sheer wall 100 feet high, and although the edge was furrowed somewhat by water-courses, it was impossible to get down on to the land from where we were. Next day, however, we were more fortunate, and found a place where it was possible to make the descent, though even here it was by no means easy. We had to lower the sledges down a slope of snow at least 150 feet high. At last, on May 12, we found ourselves once more on land, having been forty-seven days on the ice.

It was a great relief to tread the solid earth once more, where we could move without fear of cracks and crevasses; we were still more glad to find that we had stumbled upon a perfect little Arctic paradise, with moss and heather, long grass, and little willow trees—the last named being very low and stunted, creeping along the ground, but none the less most refreshing to the eye. Even this, however, was overshadowed by the discovery of tracks of musk ox, together with prints of hare and their faithful followers, the wolf and the fox. We were now sure of finding game here, and went on our way in confident hope, for as we were to keep to the land for the present we were bound to shoot something before very long. As we neared the coast the vegetation became poorer, and there were fewer signs of animal life, and at the base of Danmark fjord itself, there was less vegetation in the most sheltered spots than we had found in the most exposed place close up under the inland ice.

There was some fine scenery along Danmark fjord, the whole of the western coast, with the exception of some few breaks, being high and steep. Cape Holbæk rises almost sheer up from the water, and once we sledged for a day and a half past a perpendicular wall of rock, fully 1500 feet high and straight as an arrow. The first flat country we met with was in the Hjortefjælds valley, a plain stretching in from the coast to the foot of the hills some 4 or 5 miles away. It was perfectly level, without snow, and covered with shells, which, as far as we could see, all belonged to the same species.

On May 23 we found the first of the cairns built by Mylius Erichsen; it was placed on a high point of rock, and was visible at a considerable distance. At its foot lay a few great pieces of driftwood, with

THE ICE CAP.

LARGE WATERCOURSES INTERSECTING THE ICE CAP.

THE INLAND ICE.

smaller fragments scattered about close by, and it was easy to see that the ill-fated party had stayed for some time on the spot. The cairns contained a message to the effect that they had found game in plenty on the plains of Sjælland Slette, and were leaving here with provisions for sixteen days, intending to follow the outer coast, and not, as had previously been supposed, crossing the inland ice to Lambert land. They hoped to reach their ship in six weeks. The end of the message sounded hopeful enough, in harsh contrast to the beginning, which told briefly but very distinctly of cold and hunger, of dogs killed for food, and of their continual struggle against the water and cracks in the ice. That was all the message contained. We were now, however, moving over ground where we might expect to find everything they had left behind them in Danmark fjord, and every point, each piece of level land, every spot where there seemed any possibility of their having built a cairn or made a depôt, was carefully explored. We found nothing more here, however, and it was not until we reached the site of their summer camp that we came upon any traces of former habitation. Here, there were cairns on all the surrounding hills, placed there for purposes of survey, and on the low foreshore we found their fireplace, a primitive contrivance, which, however, had evidently served its purpose. On the ground near by lay bones of musk ox, and some fragments of clothing, nothing more, and after we had turned out the tins which stood beside the fireplace without finding anything, we went up to the nearest cairn. Here we found a report of the splendid work which these men had done, and learned of their desperate fight for life. They had worked hard to obtain the results they did, and later on to find the game which was necessary to keep them alive. Hard as the last must have been, their work in the cause of science is still more worthy of admiration, carried out as it was with hunger staring them in the face.

What was of most interest to us, however, was the information that the Peary channel did not exist. This was an insurmountable barrier in the way of our carrying out the plan which the long journey over the inland ice had forced us to regard as safest and best, namely, to make our way through the Peary channel and so down to the Eskimo settlement at Fort Conger, or farther south along the north-west coast. This was now impossible. Mylius Erichsen had got there before us, and though we should have liked to explore the Peary channel and survey such land as was to be found there, we were yet glad to add this discovery to the other important results which he, Hoeg-Hagen, and Brönlund had purchased with their lives.

The year was now far advanced, however—it was May 28. Summer would soon be upon us, rendering sledging impossible, and it was high time to think about our return. We were fairly well off as regards provisions, having food for ourselves for about forty days and dog-feed for twelve. In other respects, however, we were not so well equipped; the

sledge—we had only one now—was heavy, the seven dogs, which were all that remained of our team, were exhausted, and I myself was far from well. We did not attach any great importance to this last at the time, imagining it to be nothing more than the after-effects of an accident which had happened on the last day of our journey over the inland ice, when I had been somewhat knocked about by my sledge running away. I grew easily tired and my legs were stiff and painful, but we never dreamed that anything serious was the matter.

The going had not been very good up to now, but we had managed to get along fairly well. As soon as we turned our faces homewards, however, the snow became very soft, and as the temperature increased it grew so slushy and wet that our progress was horribly slow. We had snow up to our knees all the way from the west coast of Danmark fjord to Princess Dagmar peninsula, and as both I and the dogs were rapidly growing weaker, we were obliged to go up on to the inland ice to the east of the peninsula. Here, on the lower slopes of the inland ice, the snow was better, but there were so many cracks and deep watercourses that it was almost impossible to get along. We now decided to leave the inland ice, and turned northward towards the coast. As soon as we had determined to leave it, however, the ice improved, the cracks ceased, and the surface of the snow was good, so we preferred to keep to the land after all, rather than again attempt the passage over the heavy sea ice. We set our course for Nakkehoved and the ice was at times so flat that it was often difficult to see whether we were on the inland ice or the sea ice. At Nakkehoved, the water ceased and we did not see it again until after reaching Mallemukfjæld. At Nakkehoved, also, we saw the first living things we had seen along the coast, a lot of gulls and a goose, flying towards the north-west. Otherwise there was very little game; we did not even see any bear tracks. The dogs were now growing weaker and weaker; we had used so much of our provisions up on the inland ice that we were now obliged to be sparing with them. Nor did our progress improve when I found myself unable to walk, and was forced to ride as a passenger on the sledge instead of helping to haul it.

On June 10 we reached the depôt at North-East Rundingen, which, as far as we could see, had not been touched. We continued our way southward, and finding better ice, began to get along a little faster. The depôt at Amdrup Land was likewise untouched; there were no traces of Mylius Erichsen's party ever having visited the spot. The only reason we could think of for their having changed their plans was that the young ice which they were to follow had broken up on the coast. From Amdrup Land down to Mallemukfjæld, we again had bad ice, especially after reaching Holmland, pressure ridges being numerous and the snow between them deep and soft. In order to get along at all, we were forced to move right out to the edge of the open water, and follow this down to Mallemukfjæld, which we reached on June 20.

By this time I myself was really ill, being too weak to stand; it was scurvy. I was not sorry, therefore, when we found ourselves forced to lie up for a time by the snow, which had now grown so soft and slushy that further progress was impossible; we were obliged to wait until it had melted and the water drained off. Some days after our arrival at Mallemukfjæld, we found the depôt laid down by the "Danmark" Expedition for Mylius Erichsen, likewise untouched, but unfortunately somewhat spoiled by the water. Here, as elsewhere, along the coast game was very scarce. We found no big game of any sort, and all that Iversen managed to get in the way of meat was a few gulls. He was untiring in his efforts to provide the camp with food, often staying out for twelve or fourteen hours at a time, or even longer, but seldom returning with more than one or two at a time. The fresh meat, however, picked me up a good deal, and after a week I was well enough to stand alone, and by the time we left Mallemukfjæld some ten days later, I was able to walk and do my share of the work. It was absolutely necessary to make a move, for we could not continue to live on what we shot. We had only three dogs left now, and they were utterly worn out. We were continually having to wade through great sheets of water, and this did not improve their condition. It took us ten days to cover the 25 miles down to the south-eastern point of Hovgaard island; there we found another depôt laid down by the "Danmark" Expedition. This one had also suffered considerably, but we found food enough to keep us going for a while. We had been on short rations now for three weeks, and although the country looked rich enough we soon found out that we could not reckon on finding the game of which we were so badly in need. On land there was absolutely nothing to be had; our only hope was that we might be able to get a seal or two. We were horribly hungry; we dared not eat more than half a pound a day, and our fruitless wanderings in search of game only made us all the hungrier. We were now beginning to realize that we were fighting for our lives. To stay here was impossible; there was nothing to be done but to try and get across to Schnauder island. According to a message from Thostrup, which we had found at Mallemukfjæld, there should be five cases of provisions there. This was a tempting bait to hungry men, and we hoped to reach it before long.

We left Hovgaard island on August 3, and it took us until the 25th to reach the northern point of Schnauder island. It was a difficult journey, the ice was far from level, there were great watercourses, and in places the water had collected into ponds and lakes. In addition to these difficulties, Iversen fell sick; the dogs were now quite useless, and had to be carried on the sledge, and after we had been ashore at Lambert Land, where we were lucky enough to shoot twelve ptarmigan, we were obliged to kill the two dogs for food. Without these we should not have been able to reach the depôt.

We reached Schnauder island after having finished the remains of the

last dog, and at once began to look for the depôt. After walking for twelve hours along the coast, we found it, fortunately in good condition, everything in the case being eatable. Much against our will, we were obliged to stay eight days on the island, partly owing to Iversen's illness and partly because we both found that our skin was peeling off, doubtless the result of eating the poisonous dog's liver. We hoped, however, that the frost would set in, so that the ice could bear by the time we were ready to start. On September 4 we moved off again. We had to haul the sledge ourselves, and made but slow progress, for we were both very weak. However, it was much better going now than it had been, as the lakes were frozen over and the ice strong enough to bear.

The long stay at Schnauder island had cost us so much of our provisions that we were again obliged to reduce our rations to half a pound a day, with the addition of a single biscuit for the first few days. We were longing to reach the northern depôt and the other depôts further to the south, where we expected to find food in plenty. We found the depôts all right, but unfortunately the food had all been used. I had forgotten to ascertain the contents of the depôt before leaving home, and our disappointment was the greater, as we had never thought we should have any difficulty in finding the depôts. At last, when we reached Bjorneskær and found this depôt also empty, we realized that there was but little chance of our getting anything to eat before we reached Danmark Havn, a hundred miles further on. We had been sledging over the lower slopes of the inland ice, and when this ceased we got along as best we could over the young ice. Now, however, even this failed us, and at Bjorneskær we were obliged to leave everything behind—tent, sleeping-bags, and sledge. We took our diaries with us, and a few necessaries, together with the last of our provisions, three pounds of pemmican, and started off across the land; we hoped now to be able to cover the hundred miles to Danmark Havn in a few days, but unfortunately we were disappointed. When we reached the Skærfjord, which we had to cross, a storm came on, and the ice broke up before our eyes. For thirty-six hours we were forced to lie up in a watercourse, waiting for the gale to subside, and when at last we ventured out on the young ice another storm came on before we had got halfway across, and the ice broke up again. With great difficulty we managed to reach some rocks in the middle of the fjord, where we had to stay for two days, as the gale was raging all the time, and the ice could not close up. We had neither food nor water, and when at last there seemed to be a faint possibility of our getting across, we decided to take the risk, as we might as well drown as die of hunger. The ice, however, was so thin, and we ourselves so exhausted, that we did not dare to take our diaries with us, but left them on the rocks, and started out with nothing but a rifle, which might be the means of saving our lives. After a ten hours' journey over the thin young ice we reached the other side. There was now nothing but land between us and Danmark Havn. We had to march along the coast, and

we marched without a break, save for short rests in the darkest part of the night, for forty hours.

We suffered a great deal from hunger and also from cold, the temperature being probably below 15° C. We kept on, however, our legs moving mechanically, and on September 19 we reached Danmark Havn. It took us over an hour and a half to walk the last thousand yards.

After we had regained our strength somewhat, we tried to go northward again and fetch our diaries, but continual snowstorms forced us to turn back. The incessant gales and heavy snow delayed us so much that we did not reach the harbour at Shannon island until the night after November 25. We had been out for two hundred and seventy days, and had covered 1400 miles. When we reached the place we found a house built of timber from the wreck of our ship. Lieut. Laub had found the *Alabama* so badly damaged on his return that she was ready to sink, and there was nothing to be done but break her up and build a house on land.

Our companions were gone. They had been taken home on board a sealer which had come up along the coast. Iversen and I remained on Shannon island all that winter; it was cold and stormy, and we were glad to see the spring again, partly because we hoped to be rescued by a ship, and partly also because we could now go up and fetch our diaries, which we had left on the rocks in Skærfjord. We had to haul the sledge ourselves, of course, and the journey took us forty days. We returned at the beginning of June, and were confident that in a month or six weeks a ship would arrive to take us off. But time went on, the ice grew heavier, closing in on the land, and by the middle of July there was no open water to be seen. We were now beginning to fear that we might be forced to spend a third winter alone on the coast, but we had not yet given up hope. But when September had set in and no ship had come, we turned back to our winter quarters. On the way up we were fortunate enough to fall in with some musk ox, and got meat enough for the whole winter. But it was impossible to stay at Shannon island; we had to move down to Bass Rock, for we had no fuel, and the only means of getting through the winter was to reach the big American depôt, where we hoped to find coal in plenty. We had to carry so much that we were obliged to make the journey five times, having in particular great difficulty with a boat, which we hoped to get out to the open water. By means of this we might then be able to get away ourselves if no ship came to take us off next year. At last, however, we were obliged to leave the boat behind, together with part of our load, and it was not until November 25 that we reached Bass Rock. To our great disappointment we found that a ship had been there, not more than 15 miles away from us, and it was still more hard to see that the vessel had come in a couple of days after the ice had set in to land last summer. We spent our third winter more or less comfortably, but the continued stay in the Arctic was telling on our strength, and in the spring of 1912 we both fell sick. We had fortunately plenty of meat, so there was no great danger

of scurvy. During this spring we were obliged to make several sledge trips in order to fetch clothes and other necessaries. We attempted to get the boat along, but were obliged to give it up. We also tried to get down to Angmasalik by way of Cape Dalton; but it proved impossible. There was nothing to do but to wait, and fortunately the ice looked promising. At last, on July 19, 1912, we were awakened by the sound of voices outside the house. We had now been alone for twenty-eight months, and were naturally more than glad to see our fellow-creatures again.

Ten days later we were in Aalesund, the journey was over, and our three years in Greenland at an end.

The PRESIDENT (before the paper): Recently we met in the Queen's Hall to honour the achievements of a great Norwegian explorer, Captain Amundsen. To-night we are here to hear the record of a not less adventurous expedition by a brave Dane. Captain Mikkelsen is not unknown to us in this country. It is now some years since his first efforts to solve some of the remaining North Polar problems came under the notice of the Society. In 1907 he made an enterprising journey from the Arctic shores of Canada northward, for the purpose of ascertaining whether or not a land of very considerable extent exists across the North Polar Region away from any of the great islands which form the Arctic archipelago. On that occasion he underwent very great hardships, but lack of funds prevented him from fully attaining his object. He succeeded, however, in obtaining a large number of useful observations on the movement of the ice, tides, depths, and other matters of scientific value. His more recent expedition, the story of which he is going to tell us to-night, arose out of the memorable and disastrous experience of his countryman, Mylius Erichsen, who, in command of a well-equipped expedition, landed in North-East Greenland in 1907. He and two companions pushed their way over 200 miles into the interior for the purpose of completing a contour of the northern and north-eastern coast of Greenland. They made very useful maps, and their information proved that Greenland was entirely surrounded by the sea. But on their return journey they lost their way, and these three brave men perished in circumstances of cruel tragedy and suffering. It was to discover the bodies of these unfortunate men, and if possible to obtain any records which they might have left behind them before they died, that Captain Ejnar Mikkelsen succeeded in obtaining support for a search expedition, which left Denmark in June, 1909. He too, in an absence in those frozen regions of more than two years with a single companion, endured privations such as have seldom fallen to the lot of any living man, and both of them were within an ace of losing their lives. Fortunately they managed at last to win their way to safety, and it is to tell us the tale of this adventure of heroism and suffering that Captain Mikkelsen has come this evening. I will now ask him to deliver his lecture.

The DANISH MINISTER (after the paper): It has been a great joy, I am sure, not only to Captain Mikkelsen, my distinguished compatriot, but to every Dane, that you have listened to his most interesting account of his brave and dangerous journey in Greenland with so much kindness and interest. We Danes for many centuries have perhaps been a little late in joining all other nations in mapping out the regions of the north part of the world, where so many British names shine with a glory that can never fail. In later years, however, great interest has been taken in Denmark in the exploration of Greenland, Denmark being along the

western coast of this Arctic country in possession of a chain of colonies. In spite of Captain Mikkelsen's declaration to the contrary, I hope that he may again feel drawn back to the north, and in some years will again be able to tell us something interesting, and I am sure a great ambition would be for Captain Mikkelsen again to be allowed to speak here to this famous Society. Meanwhile I will not detain you any longer, but only express the thanks of Captain Mikkelsen in being allowed to speak here to-night—a thanks in which I and every one of my compatriots join most heartily.

Admiral Sir Lewis Beaumont: It is not many years ago that one of the Danish officers who belonged to the Mylius Erichsen expedition read a paper here and gave us an account of the work that was done by them and of the sad story which became known to them when they found the record left by the Eskimo Brünland. But compared to the expedition we have just heard of it was child's play. The amount of work which has been done by these two men is simply wonderful. It really is astounding to think that they should have deliberately set out to go those 700 miles directly north with so small an equipment—it shows a courage, at the outset, remarkable in a leader who was not ignorant of Arctic conditions. You have heard the extraordinary difficulties met with throughout the whole time; the extreme difficulty of getting over the inland ice, the poverty of the land—the absence of food even when they got to the point at which they expected to find it; where in summer you generally find musk oxen and other animals, but where they found nothing. They had only started with fifteen dogs and by that time, I do not think, had eight left, yet they contemplated coming back round the coast further than the direct line home, for the sole purpose of completing the work that they had taken in hand. I think their courage and endurance and their wonderful power of resisting cold, illness, and hunger were simply extraordinary. I think in this it forms a record expedition, for never have two men done such work single-handed with so many difficulties to overcome, or remained for two years and four months in those regions absent from all contact with any human beings at all. Through two Arctic winters they were absolutely alone, without anything to interest them, no work, no books, no animals, nothing to wile away the long winter nights. It is a record of human endurance and courage that has no parallel, and I hope that as a reward of the indomitable courage, fortitude, and patience of these two wonderful men who have stood the test of such a trial both physical and moral, that the names of Captain Ejnar Mikkelsen and his companion Iversen will appear, as a memorial of their work and of themselves, on some part of the land over which they travelled with so much pain and difficulty.

The President: In closing the proceedings I should like to say how entirely I and all my colleagues endorse the words which have just fallen from Sir Lewis Beaumont, speaking with his exceptional authority and experience. The modest and attractive lecture to which we have just listened, and the wonderful slides thrown upon the screen, left upon my mind the impression, as I am sure they did upon that of every one before me, that never in this hall has our Royal Geographical Society listened to a more remarkable tale of human sacrifice, endurance, courage, and heroism. Certainly, I myself have never, in any record in any part of the world, heard anything to equal the moving pathos of the description which was given to us to-night by the hero on my left of the sufferings of himself and his friend. We admire them for their courage, we congratulate them on their survival, we honour the nation which has produced two such men, and I earnestly hope, following Sir Lewis Beaumont's suggestion, that their names may live not only in the grateful recollection of their own

countrymen, but in the land which they have dignified by their achievements. I am sure you will join me, ladies and gentlemen, in carrying a hearty vote of thanks to Captain Mikkelsen for his lecture.

Captain MIKKELSEN: I have spoken so much I will just say a few words to thank the Council and the members for their kindness and interest. While we were up there going through the journey we were never thinking of coming home, but that it will be interesting to tell people about it and wonder how people would think of the work we had done. For the reception I have had here to-night we feel grateful, and whatever hardships there may have been, they have been fully repaid. I thank you once more for your kindness and interest.

THE BALKAN PENINSULA.*

By D. G. HOGARTH.

WHAT is meant by this term "Balkan Peninsula" and what ought to be meant? It is in popular—at present very popular—use; but those who use the term rarely ask themselves what precisely they mean, and, if they do ask, their answers do not agree. The definition of a peninsula we all know, and that the Balkans, as generally understood, mean the mountainous spine which runs obliquely across a south-eastern peninsular projection of our continent—this, too, we all know. But where exactly does that peninsula begin to distinguish itself from the continental mass? If somewhere about N. Lat. 46, below a line drawn from Trieste to Akkerman or to Odessa—and as a geographical peninsula it certainly starts from such a line—do we mean, when we think or speak of the "Balkan Peninsula," anything like so large a tract? I take it most of us do not, unless we happen to be giving a geography lesson. We think of it sometimes as bounded on the north by the line of the Lower Danube prolonged to the north-western angle of Bosnia; more often, as everything which lies on the farther side of the southern frontier of Austria-Hungary. The truth is that the term belongs less to geographical than to political nomenclature. It originated in politics, and it has varied and will vary in current meaning with changes in political grouping. It may yet expand to include all that, as a term of regional geography, it ought to include—nay, even more than this, were the proposal realized which was ascribed lately to an Austrian Archduke by the Press. It may shrink to mean no more than a fraction of the peninsula south of the Balkans, exclusive, as in common use now it is usually exclusive, of the most peninsular part of all—the present Kingdom of Greece.

I offer this short preface as a sort of apology for an arbitrary limitation of the Balkan Peninsula which, for my own purposes, I am going to impose on myself and you to-night. I propose to deal with only so much of the peninsula as lies south of the Balkan ranges. If I have put forward an

* Royal Geographical Society, March 10, 1913.

excuse which, in this temple of exact geography, is no excuse, I have also a reason, which is purely opportunist. It is this: that in the area south of the Balkans has lain the theatre of the recent military drama, and lie all the bones of the present contention. Roughly speaking, this area was the whole of the Ottoman Empire in Europe at the outbreak of war last autumn—Greece always excluded and your pardon asked for a serious inexactitude about Eastern Rumelia—and, speaking still more roughly, it is the area whose map has been altered before our eyes, and perhaps has to be altered further yet before the Near Eastern Question can become altogether matter of history.

What I wish to do to-night is to try to state the influence which geographical conditions—both general *external* conditions, those, that is to say, of *position and environment*, and also particular *internal* conditions—have had on the societies of this Balkan area, and will inevitably have on their future fate. To do this, one must take account of history to some extent; but only so far as history has been conditioned by geography and is necessary to the understanding of the present social state of the peninsula.

First the *external* conditions—those of the position and environment of the Balkan area. What are those that matter? I take it, these. With its terminal position on the European continent it offers the easiest and most immediate passage to another continent, Asia. Second, that terminal position being on the Mediterranean, it is the southern goal to which the desires of peoples, domiciled in the less favoured north, naturally tend. Third, because it is situated on the single very narrow strait which admits shipping to the southern coasts of a European area which is about half our entire continent, and is independent of Turkey, the latter's own internal condition and politics are inevitably as much an international as a national concern.

To take the first condition of position. It entails two momentous consequences: first, the through passage of the chief inter-continental land-route, and second, peculiarly intimate relations with Asia.

(*a*) The great intercontinental land-route, which is now followed by the Orient Express, is bound to traverse Rumelia from corner to corner in order to connect after the shortest possible interval with the natural road up to the Anatolian plateau. This follows the valley of the Sakaria river—the route followed, in fact, by the Anatolian Railway which is the first stage of a further transcontinental line to the Persian Gulf. It is the convenience of this connection more than anything else which determined the importance of Imperial Constantinople and Imperial Byzantium, as that of Chalcedon before them. If the transcontinental route from Europe had only to gain the Thracian Sea it would keep on down the Maritza valley to the river's mouth, there to be connected by a short ferry with the Troad: or it would debouch on the Hellespontine shore by a slight deflection to east. The first alternative has never been in favour.

The coast of the Troad outside the Hellespont is ill supplied with harbours, and is swept continually by alternating south and north winds to which the trough-like gap between Europe and Asia gives peculiar force. The second alternative was recommended in ancient days by the safe landing on both shores and an easy road of continuation into Asia Minor; but it was into western, not central, Asia Minor. The southern shore of the Hellespont is divided by a very broad belt of rough hilly country from the Sakaria valley, and the road into Asia keeps south down the coast without finding any good natural approach to the central plateau, until it has made a great elbow to the south. The armies of antiquity (for example, those of Xerxes and of Alexander), which did use this route to pass from one continent to the other, chose it not as a direct way but as a détour leading them through the Greek and Lydian cities of the western coast-lands, which it was desired to conquer or tax as a preliminary to the main enterprise. As soon, however, as an Empire came into being, which was securely seated in both continents, reaching far back into both, and requiring equally direct communication with both, the Bosporan passage was bound to supersede the Hellespontine, and the capital had inevitably to be fixed on the former strait, where, among more than one favourable site, that of Byzantium was eventually chosen.

(*b*) Now for the second consequence, intimacy with Asia. That such intimacy must result has been indicated already in what has been said about the intercontinental route. The nearer to Asia the more intimate the relation. Whatever people makes Constantinople its capital city has to reckon with Asiatic influences. The very accidents of the city's situation favour these. Constantinople turns its back on Europe, fronts full to Asia, draws its supplies thence, and belongs as really to the opposite continent as the ground on which it stands happens to do in respect of geological structure. Behind it stretches a rough and very sparsely inhabited tract flanked by sea-marshes up to the now famous Chatalja Lines. Thence, and not before, the land begins to fall towards the Rumelian river system. There, and not on the straits, one feels that Europe begins. There, and not farther south, is the true frontier of Asia.

If the possessor of Constantinople chances himself to have come out of Asia, the position of his new capital will serve to keep him Asiatic. The Turk, I need not do more than remind you, belongs to Asia—to be precise, to Asia Minor. Though this was not the first home of his race, it was its first as a settled people. Entering it as nomads, the Ottoman Turks left it two centuries later a consolidated tribal society, having learned the theory and practice of territorial empire and the art of government from the Byzantine provincial system which they found there. They found also on the Anatolian plateau peoples whose social and religious ideas were nearer their own than those of the Greek west; and the result was that when, after a long halt, they passed on to Europe, they had become Anatolians and the mass of the Anatolians had become Turks. To this day the most

genuine Osmanli is the Anatolian. This Anatolian origin it is which Constantinople has never allowed the Turk to outgrow. Had he succeeded in establishing his capital at Vienna, he would probably be at this day at least as European as his cousins the Magyars of Hungary.

If, however, the possessor of Constantinople has come out of Europe, the position of his new capital will make and keep him Levantine. Many Bulgarians and more Russians know that the day, when either nation seats its king on the throne of the Eastern Emperors, is the day when the gravest danger of social decay will begin.

(2) The desire of northern peoples for the Mediterranean lands, which has occasioned a continual trend of migration into the Balkan peninsula from the regions lying north of the Danube, is illustrated throughout history by familiar instances. I need say no more than that the tendency manifested in the first descents of the Achaeans and Dorians into Greece and continued by countless "barbarian" invasions, among which those first of the Slavs and then of the Bulgars have had the most notable results, has been exemplified in our own day by the public sentiment of Russia and Bulgaria, of Austria and Servia. The utterances of all the Tzars and their Ministers, that ever were, do not carry such conviction on this point as the folk-songs sung in the taverns of Moscow and Sophia.

(3) The influence of the great sea-route on which the capital stands is sufficiently obvious. It brings the ships of all nations into the very heart of the Ottoman Empire and makes Constantinople the only first rate capital in the world (New York not excepted) which commands, and is commanded by, a direct sea-passage between ports of alien powers. As a result, Constantinople is everybody's concern. Nothing done there can be indifferent to the aliens who hold the ends of the two cross roads. Asiatic as the Ottoman Power is, and exclusive as it would be, it has to take account of Christian Europe at every turn, and to admit European interference ever more and more in its most intimate affairs. The trouble began on the morrow of the capture of Constantinople by Mohammed II., who, finding he could not ignore the Genoese, conceded them by treaty the same local rights which they had enjoyed under the Byzantine Empire, although in these rights lay the germ of extra-territoriality. That trouble has increased ever since with every successive admission to similar treaty rights, and every assumption of them without definite admission by peoples once slaves of the Turks. As the disproportion between Moslem and Christian strength has grown, so has European influence on Constantinople, until the Ottoman government is now impeded in the exercise of the most ordinary rights of sovereignty, and the population, denationalized and demoralized, appeals from one to another of a dozen sovereign powers.

When the Ottoman Sultans first seated themselves on the throne of the Byzantine Cæsars, they intended simply to bring Asia into Europe,

undisturbed by any foreknowledge of the double obligation of civil Empire over Europeans and religious Empire over Asiatics which they were to incur. So matters stayed for three centuries. But ever since Mahmud II., and indeed (if less obviously) some generations before his time, the Sultans have had to face two ways; and their position has been so extraordinarily difficult, that one could well believe they would welcome even the loss of Constantinople, if that would simplify their task. But, of course, it would not simplify it altogether. Apart from wholly new difficulties, which the consequent loss of prestige would entail, geography will continue to enforce others. Europe must still demand passage to the Far East through Ottoman territory, and must still press on the Turks her claim to protect that passage and to breathe her disintegrating influence on both sides of the route and on all the coasts of Asia Minor and Syria.

Efforts—always in the long run vain—made by the Ottoman power to counteract this influence of the international routes have long been a hindrance to the social progress of the Empire. The construction of the railway which now follows the valleys of the Maritza and Ergene was delayed as long as possible, and a broad zone crossing the point of the peninsula about twenty miles from the capital and crowned by the Chatalja Lines, has been studiously kept untilled and almost uninhabited to this day. The restrictions also which were imposed on navigation in the Hellespont and Bosphorus under the old *régime*, and have only partially been removed under the new, are notorious.

But enough of external conditions. Let us turn to the internal geography. The southern part of the peninsula, which is very largely mountainous, displays two orographic features, which have exercised a constant influence on its history and will always control its destiny. In the first place, the main lines of its mountainous structure are disposed vertically (or rather obliquely) from northward to southward. In the second place, the slopes leading up to the horizontal mountain system which divides it from the northern part of the peninsula—*i.e.* the main Balkan range understood in the widest, or rather the longest, sense—are much steeper than the slopes downwards on the north side of that range. Before considering the result of this configuration let me state another general geographical fact which combines its influence with those two features. Speaking generally, the coasts are constituted by a series of deltaic strips divided by rocky spurs, the intervals between which are filled almost entirely by deltaic deposit, generally in a more or less marshy state, if not actually under shallow lagoon waters.

Now consider what such geographical features entail. It follows that it is easier to enter the south part of the peninsula from the north than to leave it from the south. When it is entered from the north, the lines of the structure tend to make the incomer follow one or another vertical belt

right to the sea. When he reaches this, he does not find any easy lateral passage to other belts right and left, and the odds are also that he does not find a good harbour from which to set sail. Each of the main vertical belts—four in number—into which the peninsula is divided, is marked out by nature, therefore, either to be an independent self-contained unit, or to be combined with what lies north of it rather than with what lies east, west or south. The worst geographical capital imaginable, from which to administer all the belts at once, is one lying at the extreme south-east or extreme south-west of the peninsula; and exactly in the former quarter lies, as a matter of fact, Constantinople.

It has been largely owing to these geographical facts—though not entirely—that the Ottoman power, centred in the south-east of the peninsula, remained only nominal ruler of the greater part of three of these belts, the Albanian, the Macedonian and the west Thracian, when it had long been real ruler of the fourth, the east Thracian or Rumelian, and also of the northern part of the peninsula. Further, that it attached small importance to those three western belts, deriving little good from them and rendering to them even less, while Bosnia was the favoured province from which the Governor-General of all Rumili drew his personal maintenance, and Servia was given in fief to those royal favourites, the Janissary Corps. So long as she held Bosnia and Servia, Turkey cared little what became of Albania, Macedonia and western Thrace. She had the key to them in her pocket after the battle of Kossovo. When she lost Servia and Bosnia, however, she lost that key, and had to try to establish dominion over the southern belts from the position of the greatest geographical difficulty. It is curious that it should be just those parts of her whilom European Empire, which she has held *de facto* for not much more than a century, and to which previously she attached almost no importance at all, that have ultimately cost her her imperial prestige.

Take the Balkan belts one after the other. First *Albania*. A hundred years ago this district was either actually or virtually independent of the Sultan from end to end. The greater part was being administered and enjoyed by Ali Pasha of Jannina, whom the British Government so far recognized as a sovereign that, without reference to the Porte, it accredited an envoy to his court, the well-known Colonel Martin Leake. During the past eighty years, however, the Ottoman power has been re-asserted, and fairly firmly established in the towns and along main tracks connecting these, and also on the coast. More than this cannot be said. Tribal communities, practically independent, have continued to hold all the rest, and the Porte has influenced them only by fomenting division and riding on the breaking wave of their general anarchy. But this has not been altogether the Porte's fault. The geographical configuration of the country renders any central control—and indeed, be it added, any sort of political unity—extraordinarily difficult to establish, even if the disturbing foreign influences which act from the north, the west, and the south,

be left out of account; and really they cannot be left out of the account, whether in the past or at the present moment! The greater part of Albania is formed by a series of long and very narrow valleys running across the Belt from an almost impassable mountain spine on the eastern frontier to a sea which is fringed with inhospitable malarious strips filling short intervals between rocky spurs. The flanking ridges confining the valleys are high and very steep, and there is no natural road down the length of the Belt even along its coast. These features are most fully developed in central Albania. Below the Voyutza valley, where anciently Epirus began, they are modified somewhat; but the orographic configuration which replaces them—short lateral ranges curving back from the main eastern spine and enclosing small plains—exerts much the same effect on society.

This effect is to break the population up into isolated tribal groups. There is, and for some centuries has not been elsewhere in Europe, clannish exclusiveness comparable to that still prevailing in north and central Albania, and, in a less but still a marked degree, in Epirus. The one and only influence which at present seems able to modify this separatist feeling is community of creed, and that mainly because there are so many creeds that religious sympathy creates only larger groups, free to indulge a common hostility towards other groups and to practise common exclusiveness. During the recent war we have had an object lesson in the inaction of the Roman Catholic tribes on and south of the lower Drin. It may as well be said at once that, as a rule, it is little or no use as yet to talk about *race* in the Near East as a basis of Nationality. What matters and what groups in the greater part of the area is *creed*, or better, *Religious Communion*. If you try to apply a racial criterion you find yourself in difficulties. The so-called "Turks" of Uskub are, racially, Serbs, those of Salonica partly Jews, those of eastern Macedonia and western Thrace, Bulgars. The Greeks, so-called, of Epirus are mostly Albanians or Vlachs. The Slavs of central Macedonia have not the slightest idea whether racially they are Serbs or Bulgars. Therefore, I take religious communion, not race, as the chief criterion of grouping, and when I speak of Turks, Greeks, Serbs, Bulgars, and mark their names on the map, I mean members of this or that communion. But I do not say that common language and even common racial origin go for nothing, or will never go for more than now when national education has been developed: and if anywhere they can be said to go already for nearly as much as religion it is in the Albanian belt, where independence long enjoyed has bred a common sentiment of particularism which gives an Arnaut of whatever religious communion an instinctive sense of Albanian nationality. This may well develop under autonomy until it overcomes religious distinctions; but that day is not quite yet.

The difficulties which will confront the administrators of an autonomous province of Albania may be estimated if we look very summarily at the

grouping, beginning from the south. All Epirus up to Argyrókastro is more or less hellenized, but it is only south of Jannina and about Butrinto that there is a preponderance of inhabitants who are Greeks by race, and some of these are Moslems, *e.g.* at and about Preveza. There are also Moslem and some Christian clans, which are definitely Albanian, south of Jannina. East and north-east of the latter town lies the holding of the Christian Kutzo Vlachs, the majority of whom are in communion with the Orthodox Greek Church, but do not, unless of the better educated classes, speak Greek. Since, however, the whole region up to Argyrókastro is, in the main, Christian and Orthodox (such bishoprics as there are being all Patriarchist, *i.e.* Greek), on the whole it seems equitable and not difficult to consider Epirus as a natural appanage of the Hellenic Kingdom—the more so because town life, which is fairly well developed in it, has uniformly a Greek colour, even in Jannina. Though walled off from Epirus by the very steep range of Pindus, Greece has two easy ways of entry, one on the south by the gulf of Arta and one on the north by the pass of Metzovo. On the other hand, it will be urged, and with some reason, that, apart from the presence of a considerable minority of Albanians, who are largely Moslem, Epirus is geographically a part, not of Greece, but of the Albanian Belt, and that to detach this part from the whole is to rob the future autonomous province of its most open and fertile district, in which alone settled ways of life are at all well established.

North of Argyrókastro we enter the long transverse furrows of Central Albania which are held by one Moslem clan after another as far as the basin of the lower Drin. The creed of these clans is in several instances of rather recent adoption and their profession of it is often impaired by survivals of Christianity which have been carefully preserved in view of possible contingencies. Nevertheless, here lies the focus, if there be one, of Albanian nationality—here in this block of co-religionist clans, uncontaminated by more than one or two coastal groups which are partly Christian, and by a sprinkling of Greeks in the very few towns. Though of primitive civilization and unsettled habit of life, these Moslem clans are, on the whole, peaceful and respect one another's territories. Durazzo lies in the centre of their western coast line, and was, therefore, not an inappropriate seat for the first provisional Albanian government. On the east these clans reach right up to the main watershed of the Macedonian Belt, where they march with a predominantly Christian Slav population, grouped by creed and language with the Bulgars: but they have to some extent overpassed this boundary of late and spread out into the Vardar basin past Florina, Monastir, Ochrida, and Krichevo, thanks to the eastward passage offered by the track, which follows the line of the old Via Equatia.

North of their habitat, *i.e.* north of a line drawn inland from Alessio, we pass into the "cock-pit of Albania," the basins of the Lower Black Drin and of its northern tributary, the White Drin. Here all the population

is Albanian by race and language up to the frontiers of Montenegro and far over the boundary of the Sanjak of Novi Bazar, except for a mass of Serbs in the Kossovo district; but it is of three communions, Moslem, Roman Catholic, and (less important) Orthodox Christian (not Greek Patriarchist), some clans being partly of one communion and partly of another. The purely Roman Catholic tribes, ministered to by Franciscans who have mostly been educated in Italy, lie in two blocks, one (the Mirdits and Khthela) south of the Lower Drin and another made up of several small tribes north of the river. The first block is hemmed in on three sides by Moslem clans, and on the fourth, the side of the sea, where S. Giovanni di Medua and Dulcigno lie, by a tribe which is in part Moslem. The second block has Moslem clans on the south and east, and clans of mixed creed on north and west, the latter centred on the predominantly Moslem town of Skutari. Add the proximity of Montenegro and of the Austrian occupation on the north and of a subject Serb district on the east and you have all the conditions necessary for a social life in which raiding and fighting constitute the single absorbing interest and occupation. In the recent war there has been striking division of sympathies. The great Roman Catholic clans, the Mirdits, Khthela, Shkreli, Shala, and Nikaj have held aloof altogether. The Malissori group has sided doubtfully and uncertainly with the Montenegrins. Moslem clans of the two Drin basins and the north-east have sided with the Turks, so long as there was anything to be got by doing so. But no clan has fought either long or heartily either for deliverers or masters: and none has given an assurance, as far as I am aware, that it will unite with the central tribes to form a solid autonomous Albania.

(B) The next Belt to eastward is the *Macedonian*. Here we find different geographical conditions. One long river valley runs down almost the whole length from Kalkandelen, above Uskub, to the sea by Salonica. The basin of this stream is broad and has not the savage flanks of the Albanian valleys. Only on the western side spurs recurving from the main spine, which divides this belt from the Albanian, form isolated lake basins and tend to breed the clannish spirit. A small district in the extreme south, the basin of an independent river, the Anaselica or Vistritza (anc. Haliacmon), and another in the extreme north of greater size and importance, the Kossovo plain, continued by the rugged foothill district of Novi Bazar up to the main mass of the Bosnian Alps, are geographically distinct from the bulk of Macedonia. It is true that shaggy hill-country limits the lowland at no great distance everywhere, and runs out frequently into it; and that, given the proximity of semi-independent Albania on the west, such country is bound to maintain elements of population which do not help to promote law, order, or settled life. But there is nothing in the internal geography of Macedonia sufficient to account for its distressful state these many years past. The secret lies in the history already alluded to of the Ottoman Power in Europe, which neglected Macedonia while it

held Bosnia and Servia, and these well lost, had to begin quite recently to establish effective rule in the south, with the all-important north in hostile hands. Under the circumstances it found the task too great for its social skill—or its patience—and the result has been chaos.

A hundred years ago Macedonia was almost as free of direct Ottoman control as Albania. Ali Pasha of Jannina was holding all the south-west. The Aga of Uskub had the north and the Agas of Seres and Drama the south-east. Each of these was a nominal feudatory of the Sultan, but really an independent prince. The only part which was Ottomanized and effectively held for Mahmud II.—I am speaking of 1812—was the narrow lowland in the central south running from Salonica to Monastir, and His Imperial Majesty had little fruition even of this, the best lands being tax-free fiefs of the great Ghavrinos family.

If one tries to state the grouping of population in Macedonia the most useful terms are those of religion ; but language also is not to be forgotten. In the extreme south, on the frontiers of Thessaly and Epirus, you find Hellenized Orthodox peasants spread across the Vistritza as far north as Verria on the east and Kastoria on the west. I say Hellenized rather than Hellenes, because a large element in this population, especially in the western part of the district, is Vlach, as indeed it is also in north-west Thessaly, over the border. Above these begin Christian Macedonians who, fifty years ago, continued the Hellenized population right up to Monastir, but now, having in great majority deserted the Patriarch for the Exarch, group with the Bulgars The point of a deep and broad wedge of true Turks, the very ancient colony of Kailar, has been driven southward between Verria and Kastoria far into the Hellenized country, while northward, its base rests on Vodhena and Ostrovo : and, divided from it by Hellenized and Bulgarized peasants, lies another Turkish patch west and south of Kastoria. But in all the rest of the Macedonian Belt west of the Vardar, Christians make four-fifths of the population, the remaining fifth being composed of Moslem Turks, mostly concentrated immediately south of Monastir ; of Moslem "Pomaks" (probably of Slavonic race) settled here and there both near Ostrovo, and also above Monastir ; and of Albanian intruders who have pushed eastwards from Struga and from Dibra. This fifth is so widely dispersed and so weak numerically that it does not impair the truth of the broad statement that the trunk and heart of Macedonia are Christian. Once Ottoman support were withdrawn the assimilation of that fifth would be easy. North of Uskub the Bulgarized population fades away into Serbs of old standing mingled with Albanians of much more recent arrival. The Kossovo district is divided fairly between these two ; but as the frontiers of the Sanjak of Novi Bazar are approached, the Albanian preponderates more and more, until having long ago left behind us the distinctively Macedonian water system of the Vardar, we find ourselves finally in the northernmost end of the Albanian rather than the Macedonian Belt.

If we descend the Macedonian slope again by the left bank of the Vardar (which lies well over to the east), we find ourselves among a Bulgarized population as soon as we have left Uskub for the south, but once past Kuprili note Moslems becoming more and more frequent till, some forty miles above Salonica, they grow numerous enough almost to exclude Christians from the land. Salonica itself, however, is held, as to two-thirds, by Spanish Jews, and as to one quarter, by Greeks; and the great three-pronged peninsula of Chalcidice to the south is all Hellenized, except for a narrow Moslem strip across the centre, the Greeks continuing also north-eastward along the coast and inland up to Seres in the third, the west Thracian, Belt.

Summarizing Macedonian grouping very roughly, one may say that five-eighths of the whole Belt is Bulgarized, and that Moslems, Serbs and Greeks have to be content with a fairly equal division of the remainder, the Moslems, thanks to Albanian inroads into the north, having something the best of it as against the other two minorities.

The third Belt, the *West Thracian*, need not detain us. It is made up of two long and narrow river basins, those of the Struma and the Mesta, divided and confined by high and rough hills which, east and north of the latter stream, broaden and swell into a formidable mountain system, the Rhodope. This belt has little corporate unity, and under no territorial rearrangement would it be likely to constitute a distinct province. The western half, the Struma Basin, is almost exclusively held by Christian folk (mainly Bulgar, with detached colonies of Greeks, *e.g.* about Melnik) who would fall to Macedonia; the eastern half by Moslems, of whom the great majority are "Pomaks," *i.e.* Islamized Slavs, or, possibly, aboriginal Thracians. A cluster of true Turks lies on the coast west of Kavalla and extends inland beyond Drama; but all east of the Mesta is in Pomak hands except for scattered Greek holdings on the coast. This littoral, with the foothills behind, is the main source of the best Turkish tobacco-leaf. The Pomaks, about whom Colonel Maunsell told this Society a good deal a few years back, have tended to decrease of late years, partly through natural causes, partly by emigration to Asia Minor, and their places in the Rhodope region are being steadily taken by Bulgars.

On the fourth and last Belt, the *Rumelian*, I have said something already. At this moment, at any rate, it is the most interesting, because its social fate hangs in the balance, and what has happened and will happen there is of the most vital importance to the Eastern Question. It is through this Belt that the great intercontinental road lies, its shores which the international sea-route touches, its soil which bears the capital of a tottering Empire. Geographically Rumelia is very clearly defined by mountains on two sides—the main Balkan and the Rhodope systems—and by sea on the other two. It is also in great part homogeneous, compact and easily centralized. Three quarters are comprised in the wide and open basin of the Maritza river, with its two great left bank affluents, the Tunja

and the Ergene. This basin is divided, indeed, into northern and southern portions by a range of low hills which runs across it some fifteen miles above Adrianople, and is sufficiently well marked to have been used as a political boundary since the rise of the Bulgarian kingdom. But both the Maritza and the tributary Tunja break easily through this range, and it would never have interrupted the unity of the basin in the absence of artificial political arrangements. Even under the powerful influence of these it has not interrupted ethnic continuity. Similar populations are found both north and south of it, and the grouping is largely independent of its presence.

The remaining fourth part of Rumelia, is not geographically one with the rest. It is made up of its east and south-east coast lands, which all lie outside the Maritza Basin, and whether on the Black Sea side, or on that of the Sea of Marmora, are screened by not high, but rough and shaggy hills, which effectually detach them, and dispose their populations to cultivate relations with what lies over sea to their front rather than with what lies behind the mountains at their back. As a result we find the Black Sea littoral, which is an exposed coast fronting wide waters, sparsely inhabited, and the most part of such exiguous and poor population as it has, Greek. But the southern littoral from the Bosphorus to the Dardanelles, which fronts across land-locked seas to Asia, is inhabited throughout by a comparatively dense population; and this, whether Christian or Moslem, is equally detached from the inner country and disposed to maintain its chief intercourse with opposite shores. The spot on all these coasts, most clearly detached from the main area of Rumelia by geographical barriers, is the jutting Bosporic peninsula on which Constantinople stands: for behind it the hilly screen, though low, is at its broadest, stretching back for forty miles to the Chatalja Lines. Whatever the Powers may wish, or the Balkan allies extort, or the Turks contrive, the scientific southern geographical frontier of Rumelia runs from the Black Sea near Istranja along a line fifty miles behind Constantinople to the head of the Gulf of Saros. What lies beyond that line falls socially to Asia rather than to Europe; while the great inland bulk of Rumelia, both southern and northern, is one and indivisible from a geographical point of view, and naturally centred on Adrianople, with Kirk Kilisse east, Dimotika south, Philippopoli north-west, and Eski Zagora north, for its subordinate centres.

As for the grouping of population in Rumelia, I need say no more about the coasts than that their inhabitants are compounded of Christian and Moslem elements in the usual proportion found on Ottoman coasts, and are fairly evenly divided between the creeds, if the capital city, with its preponderance of Islam, is left out of the account. The central basin of Rumelia, until fifty years ago, was mainly Moslem, with isolated but considerable communities of Hellenized folk on the Lower Maritza, about Kirk Kilisse, and in Adrianople city. Even in Northern (or, as our plenipotentiaries christened it in the seventies, "Eastern") Rumelia Moslems were in a majority, as the multitude of Turkish place-names attests, while the

minority was Bulgar. Now the Bulgars have the majority here and the Moslems the minority. Both in the earlier distribution and in the present, politics have been the chief determinant. Eastern Rumelia, once garrisoned by Moslems for Turkey, has come to be garrisoned by Bulgars for Bulgaria.

Bulgarians have long been present in southern Rumelia also, and of late years they have been settling more and more in the northern parts, about Adrianople and Kirk Kilisse. They are found also in considerable numbers on and near the coast west of the Maritza mouth, whither they have filtered through the Rhodope. They have occupied these southern districts somewhat at the expense of the Greeks; but (before the late war, at least) Greeks still outnumbered them in the proportion of almost two to one. In a few districts of inner Rumelia the two Christian denominations, taken together, are able to claim a majority as against Moslems. Kirk Kilisse, Dimotika, Uzun Keupri, Tirnova, Lule Burgas, Akhteboli and Mustafa Pasha—these are the inland districts where Greeks and Bulgarians together outnumber Moslems. But in most of those their majority is slight, whereas throughout all the rest of the Maritza basin Moslems preponderate, and in many places by large majorities. In the inland districts, taken one with another, they stand to all Christians of whatever group as two to one; but if we include the coastal districts, only as five to four. In the city of Adrianople itself they are three to two, if some 4000 Armenians are reckoned in and Jews reckoned out. On the whole, therefore, though a statement reported to have been made the other day by a Grand Vizier, that three-quarters of the population of the Adrianople province is Moslem, is not borne out by reliable statistics, the province is, or was till a few months ago, distinctly more Moslem than Christian, and certainly the most Moslem province of the Ottoman Empire in Europe.

That is all I propose to say. The Balkan Peninsula is a thorny subject at present, and if in the course of this insufficient survey of its anthropogeography I have touched on political matters more frequently, by implication and even by explicit reference, than is usual in papers read before this Society, I ask pardon. But I must plead in excuse that where grouping by religious profession affects social life as profoundly as in the Balkan Peninsula, to deal with the distribution of groups at all is inevitably to touch politics, of which grouping is the root condition. I have tried to state some anthropogeographical facts correctly, and only hope that the political inferences, which I have drawn or implied, will appear to you to be both demanded and justified by those facts.

The PRESIDENT (before the paper): I have pleasure in stating that His Majesty, King Manoel, has honoured us by being elected this day an Honorary Fellow of this Society, and that he has shown his appreciation of his first introduction to our membership by attending this evening and being present at our gathering. We will now proceed to the ordinary business of the evening. We are met to hear a paper

from Mr. Hogarth. Mr. Hogarth is so well known a figure at the meetings of the Society, of which he is a Member of Council, as to require no introduction at my hands. I may only remind you that for the last twenty-five years he has devoted himself with very little intermission to exploration, mainly archæological, in Asia Minor, Egypt, Greece, Crete, and elsewhere in the basin of the Eastern Mediterranean. He is also well acquainted with the countries of the Balkan Peninsula, about which he is going to lecture this evening. Moreover, he is the author of a whole library of books, both serious and entertaining, among which few of you will not be familiar with that delightful work 'The Diary of a Wandering Scholar in the Levant.' To-night Mr. Hogarth will steer clear of politics, and his main object will be to treat of the geographical distribution of races and religions in that part of Europe with which he deals and which has been so much in the public eyes during the past few months.

The PRESIDENT (after the paper): I do not know if Miss Gertrude Lowthian Bell is here—one of our greatest authorities on the Near East, who has written excellent books on the subject, and is, moreover, one of our recently elected Lady Fellows.

Miss GERTRUDE BELL: I listened to Mr. Hogarth with enrapt interest. It has been said that prophecy is not so difficult as some people suppose—nor is it when it is based upon the knowledge and the grasp of history which Mr. Hogarth possesses. Mr. Hogarth has not prophesied. He has left us to draw certain conclusions, the nature of which has been rendered fairly evident, and I feel that we have been lifted for a moment above the distracting clash of arms, and the heat of political controversy, into regions of calm wisdom where sober judgment becomes more possible. I should like to insist upon the truth of his observation that Constantinople, in whatever manner politicians may limit its fiefs, must always remain the capital of an Asiatic empire. Mr. Hogarth has reduced this matter to a simple scientific statement, and that is the way in which it should be treated. But in whatever way you treat it, it remains the salient fact that dominates the philosophy of Near Eastern history. I trust it will not be forgotten by the politicians of Europe. There is another point which Mr. Hogarth has helped to put upon a true basis. The diversity, the interpenetration of race and creed in what was once Turkey in Europe, and in what still remains, for immediate and future politics, Turkey-in-Asia, demand a system of administration which is totally different from that which can be applied to more homogeneous countries. Mr. Hogarth has indicated the gradual knitting together for administrative purposes during the last hundred years of the European provinces. Exactly the same has been taking place in the Asiatic provinces. Whether it is governed by the Ottoman or not, Turkey is the last country in the world where any strict centralization should be attempted or any strict uniformity enforced. We have seen the attempt made and pressed forward with break-neck speed during the last four years, and the result has been disastrous. It has ended in universal unrest, in a ruinous war, and the loss of the European provinces. I am, as you know, a devoted friend of the peoples of Turkey, but that does not prevent me from being a sincere friend of the Balkan races. Their interests seem to me to be the same, and I trust that the combatants may find that they are not in fact combatants. They are dependent the one upon the other. The problems which they will have to solve will be the same, they can only be solved in the same fashion—by a wise liberalism and by statesmanship which will not try to drown its peculiar difficulties under the jingle of Western catchwords.

Sir ARTHUR EVANS: As one whose experience of the Balkan countries goes back over forty years, I have watched with the keenest interest the dramatic revolution that is now working itself out in those regions. The root-conditions of Balkan geography, so well exposed by Dr. Hogarth, have now, moreover, an

exceptional importance at a moment when, for the first time almost since the days of the Roman Empire, the great region lying between the Adriatic and the Black sea can be looked at again as a whole. Let us hope that, whatever new settlement be now laid down, its foundations may conform to those underlying geographical conditions on which they ought to rest.

My own researches led me in former years to explore many of the Roman road-lines that once bound together those provinces into an organic whole. When we reflect on the great material prosperity that this opening up of the Illyrian peninsula on these geographical lines brought in the past, it may well raise our hopes for the future. The world has almost forgotten that all this was once an integral part of European civilization. What are now often obscure villages were the birthplaces of a series of some of the greatest rulers and lawgivers, as well as the most famous warriors that the world has seen—from Alexander to the vigorous stock of the Illyrian emperors, from Diocletian and Constantine to Justinian.

If we regard the Balkan lands from a broad geographical point of view, we observe throughout the whole course of their history the swaying of two great influences which reached that part of Europe. On the one hand you have the great wedge of the Steppes—the open country running right up the Roumanian side of the Danube, and extending through Russia to Central Asia—the avenue by which horde after horde has swept in from the Steppes, and along that line we see the traces of conqueror after conqueror—Thracians, Goths, Huns, Avars, and Slavs, Bulgars, Tartars, and Russians. On the other hand you have another path of nations, the lines of the great converging rivers of Europe, of the upper Danube, the Save and Drave—the lines which have brought into the peninsula most of European elements, the Greek, the Illyrian, the Celtic, and to a large extent the Roman (since the Roman's conquest mainly effected itself by these lines), and to a certain extent the Crusaders. In this connection I should like to say two or three words about the geographical conditions of a district of the peninsula which was hardly taken into Dr. Hogarth's account, but which still is at the present, perhaps, the most vexed geographical point with which we have to deal in Balkan politics. I refer to the Dinaric ranges—the isolating result of the parallel ranges of magnesian limestone that run more or less from south-east to north-west, and which have kept just that corner of the peninsula—the corner now occupied by Bosnia and Herzegovina—separate from the rest of the Balkans. All history shows how impenetrable that interior has been. It was only after some thirty campaigns that the Romans, although they had occupied a great deal of what is now Hungary to the north and Macedonia to the south, were able to lay hands upon that part of the Adriatic coast-line which lay at their very doors. And what is remarkable, and what is particularly interesting in the present connection, is that when the Turks conquered Bosnia they only succeeded in doing so from the Save valley, and that though they had overrun the whole peninsula from the south, they here penetrated from the north. All that part was occupied by the Servian race, the same race found in the kingdom of Servia and further south; but we have here again to take into account the isolating influence of what may be called the "Dinaric Triangle." The Serbs of Bosnia are kept apart from the rest of Servia—people of the same race are kept from their natural connection, and at the same time you see the northern Power, Austria-Hungary, occupying the interior of the country. It is thus owing to these limestone ranges that Europe is now confronted with what is perhaps its most vexed question—the Servian access to the Adriatic.

I think Mr. Hogarth has very well brought out the simple fact that from certain points of view Constantinople is the very worst capital for a large part of the peninsula. If, on the other hand, you go to Belgrade—that magnificent position, a

great historic town overlooking the junction of the Save and the Danube at the branching-point of the great roads that run to the south-east and south—you see what an enormously important position is there, and that from that point a very large part of the peninsula is dominated. When, again, you look back to Roman times you see that even when Constantinople was made the chief capital of the Empire, the centre of gravity of that Empire still lingered in that northern part, the Balkan peninsula, not, indeed, in Belgrade itself, but in the neigbouring Sirmium. The position of Salonica is in some respect equally important. Here was the seat of the Prefects of Illyricum, whose jurisdiction extended to the borders of the Lake of Constance. Salonica, indeed, seems to be at the present moment the destined point for the meeting of some kind of Federal Council of the Balkan States, if, as their friends may hope, they can agree to some lasting degree of union. It is approached with almost equal ease from Sofia, Belgrade (or whatever the new Servian capital may be), and from Athens. On the other side it would be equally accessible from Elbassan, or whatever may be the new Albanian centre. It is to be hoped that one of the results of this casting of the Illyrian lands into the melting-pot will be that Salonica, as a free and federal city, will resume her historic functions.

Sir Henry Trotter: I feel rather disinclined to rise after the very eloquent speech, which we have just listened to with so much pleasure, from our first lady member. I should like, however, to take this opportunity of offering my congratulations to Mr. Hogarth upon the very lucid and instructive lecture he has given us. Having had great experience myself in Turkey, I can bear testimony to the accuracy and the painstaking with which he has gone into this very intricate question. I may perhaps narrate just one little incident to show the difficulties inherent in collecting race-statistics in Turkey. Twenty-eight years ago I was sent on a mission into Macedonia to report upon the state of the country. I visited amongst other places the town of Vodena, to the west of Salonica, built on the site of Edessa, the capital of the ancient kingdom of Macedonia. It is situated in a most lovely and picturesque position, where the river issuing from the mountains behind is divided artificially into small streams which flow through a rich cultivated plain into the town—built on the top of a long cliff about 100 feet in height—and emerge from its crest in numerous cascades. On the ridge was the house of the Greek bishop. I called to pay my respects to him, and was shown into the waiting-room where there were a large number of peasants, with whom I got into conversation through my interpreter. What had they come for? They had come to make complaints to the bishop about their treatment by some local Moslem Bey. They talked Bulgarian and a little Turkish. After the entry of the bishop I said to him, "Who are these people?" He replied that they were Greeks. He turned to them and said, "What are you?" They promptly replied that they were Roumi (*i.e.* Greeks), after having only a few minutes earlier declared that they were Bulgars. What was I to believe?

I recollect being at Shumla in the days of Prince Alexander of Battenburg, whose guest I was for some days during the army manœuvres. I was, I think, the first Englishman to see the newly organized Bulgarian troops. All the staff and senior officers were Russians. I reported most favourably to my Government on the efficiency of the army, and prophesied that it would do well whenever called upon. Within a few days occurred the *coup d'état* at Philipopolis; the Russian officers were all withdrawn, but in spite of that in the war with Servia which followed the Bulgarians under Prince Alexander were triumphant, and would probably have captured Belgrade had they not been stopped by Austrian intervention.

Among other experiences I had the honour (in 1884) to accompany the King of Greece and other members of the Royal Family during his first visit to the recently

annexed portion of Thessaly. I spent a week on this most interesting journey. It was an affecting sight to witness the reception by the king of his newly emancipated subjects, and to see how the king was charmed at the enthusiastic welcome he received.

The PRESIDENT concluded by moving a vote of thanks to the lecturer, which was carried by acclamation.

AN EXPEDITION IN SOUTH-EASTERN LABRADOR.

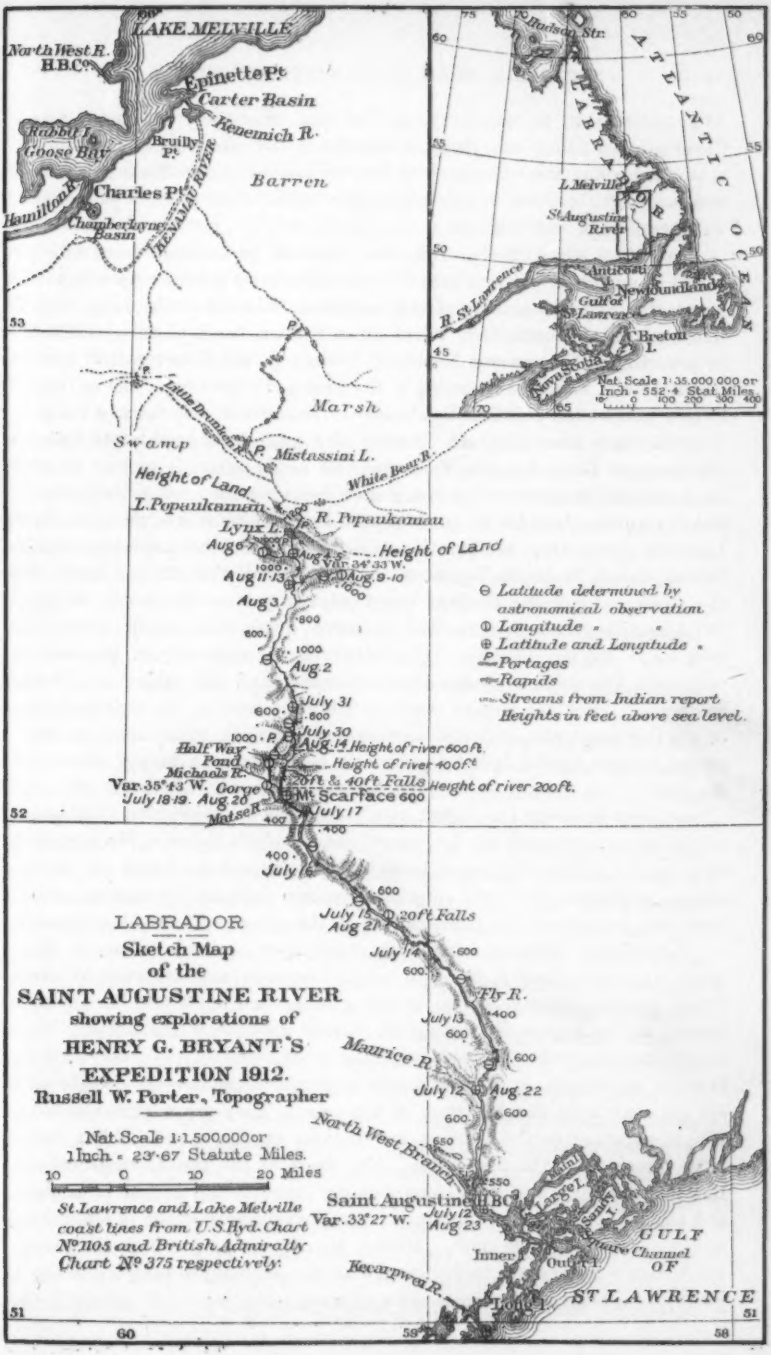
By HENRY G. BRYANT.

WE have received from Mr. H. G. Bryant the narrative of his recent expedition into the south interior of Labrador, to which reference was made in the *Journal* for November last (p. 565), as well as a map illustrating the journey, from which the accompanying sketch-map has been prepared. The following is a somewhat abridged version of his paper, which will be found printed in full in the *Bulletin* of the Geographical Society of Philadelphia for January of this year.

That the interior of Labrador, which has an area of 500,000 square miles, and an estimated population of 14,500, including 3500 Indians and 2000 Eskimo, should be so little known is not a little remarkable, but still more so is the fact that one of the most accessible portions of the country—the south-eastern—remained till recently quite unvisited by explorers. Mr. Bryant's journey of last summer—his third journey in some part or other of the Labrador peninsula—was conducted by canoe up the St. Augustine river towards a large area of approximately 60,000 square miles which had never been investigated. The result of this journey is a map such as greatly modifies the accepted location of the river from source to mouth, and pushes back some 50 miles the assumed position of the "height of land" or watershed between the drainage system of the St. Augustine and that towards Hamilton inlet. The St. Augustine river seemed to offer the most promising route to these unknown highlands, and it seemed likely that on the northern slope of the divide could be located one of the canoe routes used by the Indians, which would lead the traveller to the waters of Hamilton inlet.

With this general plan of travel in view, Mr. Bryant made preparations last spring to revisit Labrador, and, accompanied by a highly qualified topographer in Mr. Russell W. Porter, he set sail from New York on the S.S. *Stephanie*, reaching Halifax, Nova Scotia, two days later. There they obtained two 18-foot canoes, which, together with the rest of the equipment, were transferred to a small steamer making fortnightly trips to the coast of Newfoundland.

Leaving Halifax on June 25, they moved slowly northward, putting in at several fishing posts, and soon entered the beautiful Bras d'Or lakes of the island of Cape Breton through the short ship canal at St. Peters.


LAKE MELVILLE
North West R.
H.B.Co.
Epinette Pt.
Carter Basin
Kenemich R.
Rabbit I.
Goose Bay
Bruilly Pt.
Barren
Charles Pt.
Hamilton R.
Chamberlayne Basin
KENAMU RIVER
Hudson Str.
LABRADOR
ATLANTIC OCEAN
L. Melville
St. Augustine River
Anticosti
Newfoundland
Gulf of St. Lawrence
R. St. Lawrence
Breton I.
Nova Scotia
Nat. Scale 1:35,000,000 or Inch = 552·4 Stat. Miles
Marsh
Swamp
Little Drunken R.
P. Mistassini L.
White Bear R.
Height of Land
L. Popaukamau
R. Popaukamau
Lynx L.
Aug 7
Aug 6
Aug 11-13
Aug 9-10
Aug 3
Aug 2
July 31
July 30
Aug 14
Height of river 600 ft.
Half Way Pond
Height of river 400 ft.
Michaels R.
Var. 35°43' W.
July 18-19. Aug 20
20 ft. & 40 ft. Falls
Mt. Scarface 600
Height of river 200 ft.
Matse R.
July 17
July 16
July 15
Aug 21
20 ft. Falls
July 14
Fly R.
July 13
Maurice R.
July 12
Aug 22
North West Branch
Saint Augustine H.B.C.
Var. 33°27' W.
July 12
Aug 23
Mani
Larget L.
Sandy L.
GULF OF ST. LAWRENCE
Inner
Outer
Mistake Channel
Kecarpwet R.
Long L.
Latitude determined by astronomical observation
Longitude "
Latitude and Longitude "
Portages
Rapids
Streams from Indian report
Heights in feet above sea level.
LABRADOR
Sketch Map
of the
SAINT AUGUSTINE RIVER
showing explorations of
HENRY G. BRYANT'S
EXPEDITION 1912.
Russell W. Porter, Topographer
Nat. Scale 1:1,500,000 or
1 Inch = 23·67 Statute Miles.
10 0 10 20 Miles
St. Lawrence and Lake Melville coast lines from U.S. Hyd. Chart No 1105 and British Admiralty Chart No 375 respectively.

After putting in at North Sydney for coal, the party steamed across Cabot strait to Port aux Basques, Newfoundland, and thence proceeded northward along the west coast to Bay of Islands, where the services of two canoemen, brothers, together with provisions for the journey packed in waterproof bags, were secured.

On July 2, the northern cruise was resumed in the mail boat, which called at numerous places where the cod and lobster fishery season was in prospect. The fine scenery of this section culminated in the deep, fiord-like harbour of Bonne bay, where green gardens and pastures backed by towering cliffs suggested Norway. Bonne bay, it will be recalled, commands special interest now owing to the proposed extension of the railway to this part of the Newfoundland coast in connection with the new trans-Atlantic route from northern Europe. By good fortune the party found the Strait of Belle Isle free from fog, and sailed across it in four hours amid majestic icebergs, which would have rendered the passage dangerous had the weather been thick. Sighting the low granite hills of the southern Labrador coast, they in due time disembarked at the important cod-fishing station of Bonne Espérance, on an island off the northern shore of the strait. Hence the Hudson Bay Company post at the mouth of the St. Augustine river was reached in seven hours in a small "power" boat hired for the occasion. The settlement consists only of the Company post buildings, a Roman Catholic chapel, and the cabins of a few fishermen. Here Mr. Bryant was hospitably received by the acting agent of the Company, who, with the exception of a French priest then on his annual mission to the Indians, proved to be the only white man there at the time.

Anxious to secure two Indian guides to assist in packing the loads and to pilot the party amid the devious waterways of the interior, Mr. Bryant rejoiced to discover that some twenty-five families had arrived on their annual migration from the interior to obtain supplies by trading with their furs and receive the ministrations of the priest. These Montagnais or Mountaineer Indians, numbering about 2000 or less, belong to the great Algonquin family, being allied in language and customs to the Crees, and are closely related to the smaller and more primitive tribe known as Nascaupees inhabiting the barren grounds of the north. To this wandering tribe of Montagnais the great event of the year is the summer rendezvous on the gulf, where as devout Romanists they celebrate all the marriages and baptisms of the year. They are a pure-blooded people, adhering to the hunting life of their ancestors, and holding but little intercourse with the whites. The dress of the men is unassuming like that of their white neighbours, but the attire of the women is gaudy and affected, especially in the item of the Phrygian cap, made of alternate sections of red and blue cloth. During Mr. Bryant's sojourn at the post the Indian cemetery was re-dedicated with the ceremony of carrying to the graveyard a huge wooden cross and a silver crucifix.

As the days went on the agent of the Company did not succeed in inducing any of the Indians to act as guides, partly, no doubt, as a result of the usual disinclination of the race for systematic labour, and partly on account of their jealous unwillingness to allow white men to pry into the secrets of their country. But at length the priest, Father Hesry, exerted his influence with the chief Michael, with the result that two young men offered, for five dollars a day each, to guide the expedition as far as the Height of Land, which could be reached in twenty-two days. On July 12, which dawned bright and clear, the 500 lbs. of provisions and the various articles of equipment were put into the three canoes and a start was made.

The St. Augustine is about three-quarters of a mile wide at its mouth, and many sand-bars here obstruct its course. The party soon reached the forks of the river 3 miles above the post, and continued up its north-east or main branch, the entrance to which is guarded by two dark conspicuous granite hills some 500 feet high. There being no rapids, good progress was made past banks of clay and sand which supported a thick growth of spruce and fir. Occasionally strata of dark loamy soil superimposed upon the other formations were observed, upon which the hardier vegetables could certainly be successfully cultivated; but examples of this rich soil were rarely seen farther in the interior, so that in a general way it may be said that the upper valley of the river has no agricultural prospects.

With 15 miles accomplished on the first day, camp was pitched, and the evening meal prepared, but the mosquitoes and black flies soon drove the travellers to the tent, which, especially made for the trip, was practically insect proof. These insect pests, which appear to be the curse of Labrador in summer and to have retarded the development of the country, are a more fierce variety of blood-suckers than those met with in some more favoured regions. During the next three days fair progress was made against a strong steady current with occasional rapids, and Mr. Porter meanwhile continued his traverse survey of the river. A few miles above the first camp the river swung round in an ox-bow curve, but generally it maintained a consistent course from north and north-west in a narrow valley encompassed by ridges, some hundred feet high, whose summits indicated the important *rôle* played by glaciers in forming the topography of the region. On the fourth day the first falls were reached, where the stream forces its way in a narrow channel through a barrier of hard gneiss, dropping 20 feet in a distance of 621. Camping in a grove overlooking the falls, the travellers next morning transported the canoes round the obstruction, but at this juncture the Indians, instead of helping in the packing work, decided for no apparent reason to leave them. Finding argument of little avail, Mr. Bryant paid them their wages, and was not on the whole sorry to get rid of them, for while their local knowledge had proved useful, they shirked their duties altogether and were prompt in

attendance only at meal-times, when their appetites proved utterly disconcerting. He therefore decided to advance as best he could without these untrustworthy Mountaineers. The long northern summer day permitted much work to be done.

Sometimes the rapid current made poling necessary, when two of the party would lighten the canoes by walking, and difficult rapids were usually negotiated by "tracking." Shortly before noon the canoes were run ashore for lunch, when, if the weather permitted, the topographer secured a meridian altitude of the sun. The river teemed with trout, which afforded good sport, and now and then salmon were seen leaping from the water. Many places on the river-banks bore deposits of magnetic iron ore sand.

After the first falls a long stretch of slack water extended, the stream having broadened out into a lake-like expansion, and across this the advance of the party was aided by an improvised sail rigged in the canoes. The scenery improved as they advanced. "Rounding some rocky point," Mr. Bryant writes, "we thrilled with the vista of sparkling water and lofty ridges stretching away in the blue distance, and the thought that we were the pioneers in this wilderness produced a feeling of expectance and stimulation which added interest to our journey. We were always wondering what lay beyond the blue mountains." Eventually they approached a district where a forest fire had desolated the hills to the westward, and where the valleys of converging ranges of hills met, forming a basin into which drained the waters of three streams. The main river, which had maintained an average width of some 200 yards, was here confined in a narrow gorge formed of pinkish gneiss, and extending half a mile to a point where it terminated in a picturesque waterfall 45 feet in height. The party advanced for some distance up the gloomy gorge till the current became too heavy to be negotiated. A search of the cliffs on the left bank of the river disclosed a dim Indian trail, which they followed with their tied-up canoes and packed equipment past a camp site three-quarters of a mile beyond, till they came to a tributary stream which entered from the north-west, and which they named the Michael river in honour of the chief of that name. Camp was pitched there, and time was spent in examining the falls, referred to above, at the top of the narrow gorge. A tumbling reverberating mass of fleecy water enters a deep pool amid bastions of dark red gneiss. Just about here the valley shows a fire-swept area with lifeless tree-trunks still standing, and a new growth already covering the slopes. But now came the most trying part of the journey in connection with the circumvention of the falls and miles of unnavigable water above them. The Indian portage led north-east over two mountain ridges over 700 feet high, and was found by a scouting trip to be fully 10 miles in length. It became a serious problem how to transport the canoes, each weighing a hundred pounds, and the provisions, over this long trail. At this critical

point, moreover, Mr. Bryant learned that two days previously one of his canoemen had wrenched one of the tendons of his knee whilst dragging his canoe over one of the rapids in the gorge. He had concealed his injury as long as possible, but now the condition of his leg was such as to necessitate complete rest, with the consequence that the party was reduced to three able-bodied men. The transportation of the canoes and twenty-one packs over the portage, which at first taxed the muscles very severely, occupied ten days and had to be done in relays, and it was with feelings of keen satisfaction that the travellers came out on the river at the end of the portage and launched the canoes again.

From this point the valley of the river became narrower and rapids more numerous. "The stormy weather encountered on the big portage was now succeeded by days of sunshine, and even at this high elevation the temperature was such as we enjoy during our Indian summer. Only at a few of our high camps on the long portage was the temperature low enough to form a scum of ice at night." Above the gorge the explorers encountered no more specimens of birch or other deciduous trees, but came across many park-like expanses where spruce and larch flourished, and where a thick growth of creamy-white caribou moss covered the ground. Apart from the ubiquitous trout, they found the game resources of the country disappointing, but managed to kill one caribou and a few geese, ducks, and spruce partridges. Bird-life, however, was abundant and much in evidence. Owls were especially numerous, thriving upon the field-mice and other rodents found in the alder thickets and marshes, and one day a pair of ospreys was disturbed near their nest on the top of a dead spruce. Eventually they arrived at a point where the river forked, and very naturally became uncertain which branch to ascend. After studying a rude map of the Indian route of travel across country, which the chief, Michael, had provided him with, Mr. Bryant determined to follow the stream coming in from the north, as it seemed to have the greater volume of water and led in the right direction. Abandoned Indian camps, moreover, served to strengthen their belief that they were now on the main line of travel to Lynx lake, the source of the river on the Height of Land.

Two days after leaving the forks, as they were wading in the water and dragging the canoes with great toil through the shallow rock-strewn stream, they actually did emerge on a desolate lake filled with large pickerel, and measuring about 1½ mile in diameter. As a search of the neighbourhood, however, failed to disclose any sign of an Indian camp or trail, they concluded that this was not Lynx lake, and accordingly returned to the forks of the river, spending over four days investigating the other branch, only to find it utterly hopeless as a canoe-route. The invalided man, who had twice fainted from the acute pain in his injured leg, was now left at the camp at the forks with Mr. Porter to look after him, and Mr. Bryant set forth to make a last attempt to locate the Indian route. To

this end he again, with his canoe mate, ascended the main stream to the last Indian camp they had seen on its banks. Here they spent the night, and the next day, August 13, found a well-marked trail which led in a north-north-east direction to a beautiful body of water measuring about 3 by 2 miles. This they at once recognized to be Lynx lake (Ipishui Nipi of the Indians). The Indian map failed to show that the lake was reached by a portage. Now at last the true route, worn smooth by generations of moccasined feet, was before them on the farther side of the lake, and the lofty ridge of the actual watershed was in full view. Ten more days of travel by lake and stream over the Indian route, spent in portaging and shooting rapids, would have landed the explorers at North-West river, in Hamilton inlet, 50 miles away—the end of the journey originally contemplated. But Mr. Bryant declined to submit his companion to the risks of so perilous a journey, and so, leaving his record on a tree overlooking Lynx lake, he sadly returned to the camp where the river forks, and next day began the rapid descent. It proved exciting sport shooting the rapids and making runs of 40 miles a day. The long portage was again a sore trial to the whole party, although the sick man managed to limp along somehow. The distance between the river gorge and the port at the mouth of the river was covered in three days, the latter place being reached on August 23, to the surprise of a party of Indians wending their way upstream.

NOTES ON THE MAPS ILLUSTRATING THE EXPLORATION IN MONGOLIA AND DZUNGARIA.*

By DOUGLAS W. CARRUTHERS.

These two maps, of the basin of the upper Yenisei and of the Karlik Tagh, are the outcome of exploration carried out by me in 1910–11 during the expedition made in conjunction with my friends Messrs. Miller and Price, as described in the *Geographical Journal* for June, 1912.

They comprise, firstly, a map of the basin of the upper Yenisei, or the land of the Uriankhai, and its surrounding regions, on the scale of 1 : 2,000,000 or 31·56 stat. miles to an inch, compiled from the latest Russian sources, and from my own surveys. Secondly, a map of the Barkul and Karlik Tagh ranges on a scale of 1 : 500,000 or 7·89 stat. miles to an inch, compiled from a plane-table survey based on astronomically fixed points of Russian origin, and from Mr. Cecil Clementi's recent work.

1. The first map illustrates the whole of the basin occupied by the upper sources of the Yenisei river, and the border-ranges surrounding it; it also shows the configuration of the country on the Siberian as well as on the

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* Maps, p. 420.

Mongolian side of the basin, and includes the Turgun or Kundelun mountains in North-Western Mongolia. This map has been compiled from several different sources, my object being to bring together the material collected by various travellers since the publication, in 1887 and 1891, of the Russian frontier map, and to give an up-to-date general map of these regions, illustrating as well the itinerary of our expedition.

The map is based on sheets Nos. V. and XIII. of the map of the "Southern Frontier Regions of Asiatic Russia," published by the Topographical Section of the Russian General Staff, St. Petersburg, in 1891 and 1887 (re-issued in 1910) respectively. All fixed points, on which my surveys rest, have been taken from these maps, and since their publication there have been no more positions fixed by astronomical observations. In the western portion of the map, however, quite recent surveys by Prof. Sapoznikoff have compelled me to make use of his astronomically fixed points in the Little Altai and Sailugem ranges, and to adjust the remainder of the map of that region to these points. These two points are marked on the map.

On to this ground-work, I have placed my own surveys along the route of our expedition, as shown by the route marked in red. Besides this, there are several improvements on the Russian maps mentioned above. The material collected by the Russian botanist, R. N. Kriloff, 1892, has been used, much of the detail of the lake-country at the eastern end of the basin being taken from his sketch-maps, and I have consulted his work when trying to unravel the problem of the true topography of the country between the Bei Kem and Khua Kem.

A certain amount of new work, for which I am not responsible, is incorporated in that portion of the map which includes the Amil river and its tributaries; although this lay on our route it was not surveyed by me, for I did not begin my work until reaching the watershed of the Syansk, which is the frontier of Siberia and China. This portion, as well as that of the Kemchik river and its tributaries, has been taken from a new unpublished survey I came across in Siberia. The map of the Turgun or Kundelun mountains has been completed. The eastern side rests on Potanin's original work, but the upper portion of the Kundelun valley and the whole of the western side of the range depend on my own plane-table survey.

In the construction of this map I have put in all detail, according to the latest information, but cannot vouch for its correctness. It is a map of the region as known at the present date. There is ample work awaiting the explorer, consisting of pioneer work in certain localities and detailed survey work in others, and only this will show to what extent my map can be relied upon. For the use of future travellers, I will describe the regions where errors are most likely to exist, and the degree of dependency which can be placed on existing surveys of these areas.

The Siberian side of the Syansk range can be taken as correct, except in the extreme north-eastern corner, where I think grave doubts exist as to

the true course of the upper parts of the Tuba and Kazir rivers. On the southern flanks of the Syansk, the headwaters of most of the rivers are unknown, excepting those up which routes led to passes over the range. The Syansk range itself lacks detailed survey, and the same may be said of the whole of the encircling border ranges of the basin. The main configuration is correct, but detail is lacking.

Of the interior of the basin the least known regions and those needing further investigation are the area between the Khua Kem and Bei Kem, the basin of the Khua Kem and the southern portion of the Kemchik. I found great difficulty in working in the new map of the Kemchik with the old Russian survey of 1887, and in joining up the headwaters of this river and its tributaries with the mapping of them as shown by Prof. Sapoznikoff in his volume the 'Mongolian Altai,' published in 1912. There may be large errors here which will be shown up by more detailed work in the future.

The general land features can be relied upon. The proportionate size of the border ranges with their correspondingly steep or easy gradients, are here shown for the first time. Trouble has been taken to accentuate the feature of the enclosed basin drained by the Kemchik, Ulu Kem, Bei Kem, and Khua Kem, and of the inner basin of the upper Bei Kem.

The map of the region through which the expedition passed, was plotted from a prismatic-compass survey, which was carried out from the point where the Syansk range was crossed at the Algiak Pass, and the Bodkhan Khalat karaul on the southern slopes of the Tannu Ola. Beyond this point the survey was made with plane-table and telescopic alidade.

2. The second map illustrates the extreme eastern end of the Tian Shan mountain system, or the continuation of the Bogdo-ola section of the Tian Shan, known as the Barkul Range and the Karlik Tagh or Hami mountains. The map has been compiled from my plane-table survey (plotted on a scale of 1 : 400,000), but all available material has been added to this in order to make the matter complete in every detail. Here, as in the last map, I was dependent upon Russian authorities for the fixed points. But since my return the systematic work of Mr. Cecil Clementi, who, in 1907–8, obtained an almost unbroken chain of positions fixed by astronomical observations across the whole width of China, from Kashgar to Hong Kong, has been published; and this has compelled me to take his position for Hami or Kumul as correct. In consequence, when plotting this map, the position of Hami has had to be moved $7\frac{1}{2}$ miles to the west of the Russian position, and the whole of the drawing of Karlik Tagh has been necessarily adjusted in accordance with this new position of Hami, whilst Barkul remains as fixed by Rafailow (under Potanin) in 1876–7.

This map of the Karlik Tagh is complete, but the Barkul Range needs the addition of much detail. I have included the eastern portion of the Bogdo Ola range in order to show how the two mountain ranges, although orographically the same, are only joined by a low rolling plateau, which is,

however, a definite dividing line between two faunistic and floristic regions, namely, the Tian Shan and the Altai.

The altitudes throughout the journey were taken with an Hypsometrical apparatus (by Cary, and in a few instances by an instrument by Negretti and Zambra). In most cases readings were recorded from two thermometers, which were tested before leaving England and on my return, at the Kew Observatory. After twenty months' work in the field the thermometers read the same as they did at the start; and the same corrections have been applied throughout, when working at the results.

In working out the altitudes, the mean readings for sea-level, for the month of the year, have been taken from the charts of the 'Climatological Atlas of the Russian Empire,' published at St. Petersburg in 1910. The temperatures have been corrected by the isothermal charts from the same atlas. Other altitudes were taken with a clinometer attached to the folding telescopic alidade (Reeves' patent made by Casella), which was used with the plane-table.

As a whole, my readings for altitude correspond fairly accurately with those recorded on the Russian maps. Only at one station, Hami or Kumul, did I find a real discrepancy, for which I can give no explanation. Not only does my altitude for Hami differ from the Russian map, but the records taken by three other explorers vary in the like degree—namely, Russian, 2810 feet; self, 3386 feet (hypsometer); Stein, 1740 feet (barometric); Clementi, 2140 feet (barometric); Bell, 2600 feet. It is impossible to decide where the error lies, so I have on this map recorded my own altitude, for on it depends many clinometer readings, and all the other heights on the sheet are in proportion.

Variations of the compass were recorded with Reeves' patent astronomical compass (by Stanford).

The spelling of place-names, always a difficult matter, is here made more intricate on account of the fact that there is generally a Turki, a Mongolian, a Chinese, and very often a Russian, form for the name of any one place. In the vast number of cases the names have been recorded by Russian explorers, and these have been transliterated into English in accordance, as far as possible, with the system of orthography as laid down by the Council of the Royal Geographical Society. On the map of the Karlik Tagh I have used those names already recorded by Sir Aurel Stein, as written by him.

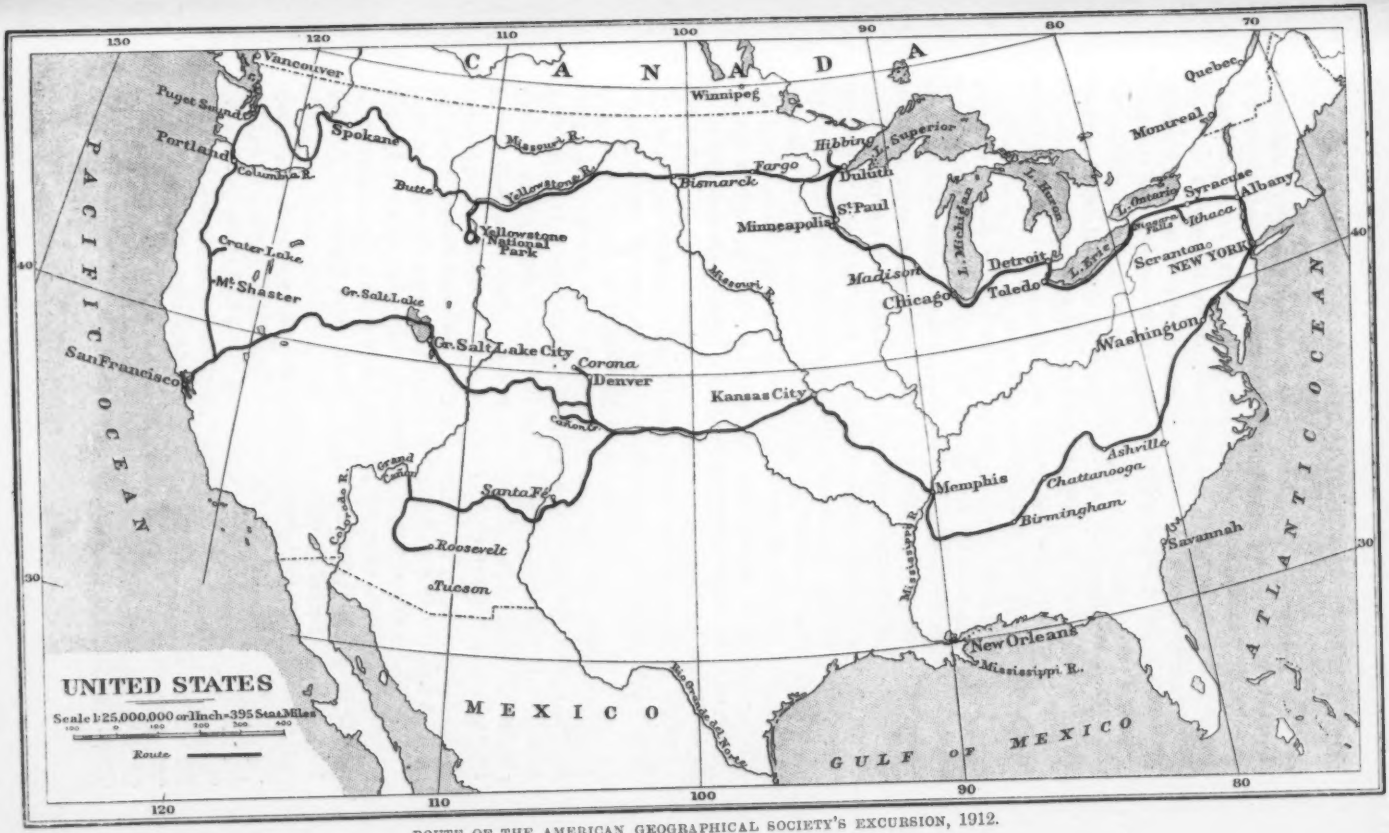
CELEBRATION OF THE SIXTIETH ANNIVERSARY OF THE AMERICAN GEOGRAPHICAL SOCIETY.

Nine years ago the American Geographical Society of New York took a leading part in the arrangements and in the entertaining of European visitors at the Eighth International Congress, an account of which by Dr. H. R. Mill appeared in the *Geographical Journal* for January, 1904.

Last year the same Society celebrated its sixtieth anniversary and recent removal into a fine new building standing high on Broadway, towards the northern end of Manhattan Island. The celebration took a form which is probably unique, and was certainly delightful to the party of between forty and fifty geographers from Europe who assisted at it. There was at the end, on October 17 and 18, a short two days of scientific and social meetings in New York, but this was only the wind-up of a remarkable excursion, directed by Prof. W. M. Davis, across the whole width of the American continent, in the course of which thirty-two states of the Union were traversed, and the Canadian border invaded for a few hours, during a journey of between 13,000 and 14,000 miles, more than 12,000 of which were by rail, and the rest on steamer, motor-car, horseback, or waggon.

The leading European societies were invited to appoint delegates to take part in the excursion, and the party which left New York on August 22 included representatives of the Geographical Societies (in alphabetical order) of Amsterdam, Antwerp, Berlin, Bern, Brussels, Budapest, Christiania, Copenhagen, London, Paris, Rome, St. Petersburg, Stockholm, and Vienna, of the University of Paris, and of the Ministry of Public Instruction in France. Through the generosity of a wealthy patron, whose name it is understood is not for publication, appointed delegates were the guests of the American Society for the whole of the journey in America. Most, but not all, of the visitors were men engaged in the University teaching of geography; thus, the R.G.S. was represented by Mr. G. G. Chisholm, from Edinburgh, and by Mr. H. O. Beckit and Mr. A. G. Ogilvie, from the Oxford School of Geography staff. To mention only a few among the continental delegates there were present from France, Messieurs de Margerie and E. A. Martel, with Profs. Gallois and de Martonne; Profs. Partsch and von Drygalski and Dr. Gottfried Merzbacher, from Germany; Prof. Brückner and Prof. Oberhummer, from Vienna; the Russian General Schokalsky; and also Profs. Andersson, from Stockholm; Chaix, from Geneva; de Cholnoky, from Koloszvar; Marinelli, from Florence; Niermeyer, from Utrecht; Olufsen, from Copenhagen.

Between New York and Washington, by way of Niagara, Detroit, Chicago, Duluth, Yellowstone Park, Puget sound, San Francisco, Salt Lake, Denver, and, after a *détour* as far as Southern Arizona, eastward again through Kansas City, Memphis, and Chattanooga, along the route shown in the map on p. 351, the party had its own well-appointed special train, to which it always seemed to return after side trips with renewed pleasure. Only ten American members, besides the director, made the whole trip, but many others joined and left from time to time. To the local knowledge and kindness of all of them the European members owe much more than can be expressed in this short and rather belated notice, but those present will remember the sincere and eloquent words in which Dr. Partsch and Mr. Chisholm voiced the grateful feelings of the whole of the Europeans towards their American hosts, at a memorable



ROUTE OF THE AMERICAN GEOGRAPHICAL SOCIETY'S EXCURSION, 1912.

and crowded meeting on board the train just before the party began finally to break up; the present writer cannot let pass this opportunity to re-echo all that was then said, and to express his own and his colleagues' appreciation of the unbounded hospitality shown throughout by railway officials, chambers of commerce, universities, and other local bodies too numerous to name, which added so much to the comfort and amenity of travel.

This is not the place in which to attempt anything like an adequate account of an admirably conceived and splendidly managed trip, or a continuous record even of all its leading incidents; but the few notes following may give some idea of its general character.

In the first place, mention should be made of a short preliminary excursion which a few of the visitors, who had reached New York early, made across the New Jersey lowland, through the Delaware water gap, and as far as Scranton in the anthracite coalfields of Pennsylvania, under the guidance of the State Geologists of those two states. As it turned out, this formed a very desirable supplement to the somewhat hasty view of the Appalachian regions which the regular excursion afforded.

The morning of August 21 was given up to preparations for the long journey, and after lunch provided by the Whitehall Club nearly at the top of a skyscraper down town, with a visit to the U.S. Weather Bureau at the very top, a good impression of New York as a seaport was given in a short trip by special steamer about the harbour, with Dr. G. F. Kunz, President of the American Scenic and Historic Preservation Society, as chief guide. The party then landed at a pier up town in time to proceed to an informal dinner at the New York Harvard Club.

Before taking train next day, there was an opportunity to see a great railway station under reconstruction at the Grand Central Terminal, from which the special train started up the left bank of the Hudson. After a run of an hour and a half Fishkill was reached, where the great waterway passes through narrows above which its valley broadens notably. Here, at this upper gate of the Hudson, the party ascended Mount Beacon and gained a splendid view of the upland and valley, where the significance of the physical features and their utilisation by man were explained by Prof. Dodge, of Columbia, whose address was followed by a brief exposition of the Katskill water scheme by Mr. J. W. Smith, Chief Engineer of the New York City Water Supply Board.

The party then went down the hill again and continued its journey past Albany as far as Little Falls, where Prof. Brigham, of Colgate University, demonstrated the main features seen from a bluff above the Mohawk, and Mr. Whitford, of the New York Department of Engineers, described the Hudson-Erie canal schemes. On returning to Little Falls station, what soon came to be the familiar passage of fast freight trains carrying food stuffs to New York, even from the Far West, for a few minutes delayed the resumption of the journey, which ended for this day at Utica. Here the

first night was passed in a wonderfully good hotel—a concession, perhaps, to European fears of the American sleeping-car.

All day there had been fine views from the car windows, and never a failure of demonstration or explanation; this rather long description of a specimen day will show how much observation could be done from, or quite close to, the railway. The next day's programme was very similar, with the addition of a side trip by motors, provided by the local Chamber of Commerce, to the dead Niagaras of the Green lakes near Syracuse, and a visit to Cornell University at Ithaca. A night in the train, and during the third day Niagara was reached, and thirty hours there spent.

Thus, with repeated stops, and no trying continuous travelling, the excursion continued; but merely to name the places seen, the kind hosts met, and the experts who guided the party would need more than all the space here available. Half a day on Lake Erie, a day in Chicago, another in the driftless area near Madison, yet another at the great iron-mines of Hibbing beyond Duluth, to select haphazard, followed. But to pass over many days, including nearly a week in the Yellowstone Park, a sample of the longer side trips may be taken, in south-western Oregon.

Here, in Rogue River valley, at the little town of Medford, the local residents, mostly fruit farmers and many of them University men, were waiting with motors, in which the party were carried 90 miles or so, most of it through virgin forest, over half-made roads up into the mountains, and at the top came suddenly the wonderful sight of Crater lake. Here camping, but luxurious camping in beds, for two nights, and a return by the same road, and so on by train past Shasta in the gathering dusk, towards San Francisco, the excursion's farthest west.

From here on the journey began to be somewhat more hurried, and after the first and only serious rain had delayed the party, in the partially reclaimed Arizona deserts, most of them at the great Roosevelt irrigation dam on Salt river, while a few were at the Desert Laboratory at Tucson, some necessary speeding-up caused abbreviation of the programme; but the party had already seen the Great Basin, the Front Range, the Grand Cañon, and were still to have the experience of 90 miles on the almost deserted Mississippi, but most of the sight-seeing was done from the train.

It is, perhaps, natural that a large proportion of the features to which attention was called were facts in physical geography; far the larger part of the admirable guide-book, specially written for the excursion by Prof. Davis, was concerned solely with physiographic description, with the improvement and rationalization of which he has so long identified himself. In America geologists seem quite often ready to regard physiographic study seriously, in a way that is rare in Britain at any rate; but even across the Atlantic the unfortunate and surely needless antagonism between the geologist and the geographer is too often visible. The development of other sides, and especially the human side, of geography, appears to be making progress, but not very quickly. It appears that the practically

universal lay opinion in America is that a geographer is one who makes maps.

Near the close of the excursion several days were spent in Washington, mainly in the offices of Government Surveys and other departments which do work of a geographical nature. The European members have consequently the means to appreciate the generous scale upon which official publications are distributed in the States.

Not the least of the advantages of a gathering like this is, of course, the opportunity for the renewal of old, and the making of new, acquaintances; and the journey provided manifold occasions for informal but spirited discussion, no matter how inconclusive the results immediately attained sometimes were. That was inevitable when the speed of travel and the necessarily hasty nature of the observations possible are considered. Innumerable impressions, however, were stored up, ready for digestion at leisure.

THE ANTARCTIC EXPEDITIONS.

I. THE BRITISH EXPEDITION.

THE survivors of Captain Scott's expedition are now on their way home, and a part of them are due to reach this country within the next two months, in time to be present at the meeting of the Society arranged to take place in their honour on May 21, in the Albert Hall. Lady Scott, who, it will be remembered, was on her way out to New Zealand to meet her husband when the news of the disaster was brought by the *Terra Nova*, reached Wellington on February 27, having heard the sad news when the *Aorangi* (in which she was a passenger) was off Fiji. She was met by Commander Evans and by her brother, Lieut. Bruce, afterwards proceeding to Melbourne, whence she sailed homewards in the mail steamer *Medina* on March 11. During her stay in Australia she met with the warmest sympathy and kindness from all with whom she came in contact. Captain Scott's journal, placed in her hands by Commander Evans, is described by her as "excellent and complete," and the whole will eventually be published.

Commander Evans and a part of the scientific staff of the expedition are also on their way home by mail steamer, while the remainder have sailed in the *Terra Nova*, under the command of Lieut. Pennell.

Sir Clements Markham desires to add to his appreciation of Captain Scott, which appeared in the March *Journal*, the following requiem written by Lady McClintock, "the widow of the greatest Arctic explorer to the memory of the greatest Antarctic explorer" * :—

* Sir Clements Markham asks us to note the following corrections to his tribute to the dead explorer printed in the March number: P. 218, line 14, *for* "yards" *read* "miles"; line 29, *for* "Sir Richard Egerton" *read* "Sir George Egerton"; p. 219, line 6 from bottom, *for* "the greatest" *read* "one of the greatest."

"Ashes to ashes. But the Spirit's way
Who knoweth? Perchance in Britain's sorest need
Some mighty soul may rise the storm to sway,
Inspired to greatness by your hero dead."

The following additions have now to be made to the list of messages of condolence given in the March number. They have been received from: Maharaja Sir Chandra Shumsher Jurg, G.C.S.I., of Nepal; Comm. Guido Cora; Dr. and Mrs. W. S. Bruce (accidentally omitted from the former list); Edouardo Lembke; Marseilles Geographical Society; Oceanographical Institute of Monaco; Madrid Geographical Society; Barcelona Commercial Geographical Society; Geographical Society of Algiers and North Africa; Royal Netherlands Geographical Society; Geographical Society of Chicago; Argentine Geographical Institute; Royal Microscopical Society; Leeds and Yorkshire Geographical Society; South Bank in Normanby Urban District Council; Crewe Literary and Philosophical Society; Dental Association of New South Wales; Municipality of Simon's Town; Canadian Peace Centenary Association; Legislature of British Columbia; Victorian Club, Boston; Order Sons of St. George, Lodges 78 and 173; Sons of England, Grosvenor Lodge No. 120, Montreal; St. James Literary Society, Montreal; Entomological Society of Ontario; Lodge Manchester, Sons of England Benefit Society of Canada; Old Countrymen's Association, Mimico, Ontario; East Hamilton Progressive Association, Ontario; Ward VI., Conservative Club, Vancouver; Britishers' Club, Y.M.C.A. of Chicago; T. D. Williams.

It may also be mentioned that, at a general meeting of the Royal Italian Geographical Society * held on February 23, a Gold Medal was awarded to the memory of Captain Scott, and silver copies to that of his four gallant companions. The Municipal Council of Nice have passed a resolution to name one of the streets of the city after Captain Scott.

II. THE AUSTRALIAN EXPEDITION.

Dr. Mawson's ship—the *Aurora*—reached Hobart on March 14, and the further details given by those on board, together with one or two messages received by wireless from Dr. Mawson himself, make it now possible to gain a clearer knowledge of the circumstances which led to the loss of Lieut. Ninnis and Dr. Merz, and to the enforced detention of the leader in the inhospitable region of Adélie Land. On the arrival of the ship at the main base, Dr. Mawson had not returned from his expedition into the interior,† and as it was necessary for the *Aurora* to proceed

* The addition "Royal" to the title of the Society has lately been granted by the King of Italy, its Honorary President.

† According to one account, Dr. Mawson had pushed inland almost to the position of the South Magnetic Pole; but whether on this or on a previous trip is not quite clear.

without delay to the second base for the purpose of bringing away Mr. Wild's party, it became evident that the leader might have to submit to a forced detention for a second winter. The whole party were ready to stay and search for their leader during the ship's absence, but in the end it was decided that six only should remain. The *Aurora* left on February 8, and only eight hours later received a wireless message saying that Dr. Mawson was safe, and instructing her to return to Commonwealth bay, which she did. But a hurricane prevented all communication with the land, and the captain therefore decided to start again for Mr. Wild's base, as delay might prove disastrous to his party. Making all speed by the use of both steam and sails, and keeping on even at night, the *Aurora* threaded her way by narrow leads amid vast fields of pack-ice, and succeeded in carrying out her task. She reached the second base on February 23, and took off Mr. Wild's party, eight in number, who were all well. Mr. Wild reports the formal taking possession for Great Britain of the land between Kaiser Wilhelm's Land and 101° 31′ E., under the name King George V. Land. The coast-line trended almost due east and west, and was almost on the Antarctic circle.

From Dr. Mawson's messages it appears that he was accompanied on his last sledge expedition by Lieut. Ninnis and Dr. Merz, and that on December 4, 1912, whilst exploring a new coast-line 300 miles south-east from the winter quarters, the young officer disappeared in an unfathomable crevasse, with a dog-team and almost all the food. The other two were left with scanty supplies and six starving dogs, on whom they chiefly subsisted while endeavouring to make their way back across the plateau. Bad weather impeded their progress, and on January 17 Dr. Merz died from the results of insufficient nutrition. Dr. Mawson made his way alone to the hut, through snow and fogs, over heavily-crevassed ice, miraculously guided, as he says, by Providence. He arrived only a few hours after the departure of the *Aurora*, which does not seem to have been able to return after rescuing Mr. Wild.

Various accounts describe the weather conditions in Adélie Land as the worst experienced in any part of the Antarctic, and it is to be feared that Dr. Mawson and his six comrades may have a trying time during their enforced detention.

III. THE GERMAN ANTARCTIC EXPEDITION.

A summary report on the course of this expedition, drawn up for the leader by Dr. Erich Przybyllok, the magnetic observer, is printed in the first number of the *Zeitschrift* of the Berlin Geographical Society for 1913 (issued in February). On December 11, 1911, the *Deutschland* left South Georgia and stood southward. The first ice was met with on December 14, and the first heavy pack on the 17th. Navigation became increasingly difficult, but an advance was made by slow degrees until, on January 24, the ice suddenly opened and permitted more rapid progress. On the 27th

the first indications of land appeared in the form of blue mud obtained from a depth of 3432 metres (1876 fathoms), in place of the 4000–5000 metres maintained since crossing the sill between the Sandwich and South Orkney groups. On the following day the depth rapidly diminished, and on the 30th, in 76° 48′ S., 30° 25′ W., a gently rising inland ice-cap was sighted, reaching a height of 200–300 metres, and ending seawards in a perpendicular wall 20–30 metres (65–100 feet) high. It entirely covered the land, presenting the appearance of a smooth uniform shield gleaming in the sun. Following the ice-edge, the ship reached, a little north of 78° S., a small bay, which was named Vahsel bay after the captain of the *Deutschland*. It was bounded westward by lower masses of ice broken by channels, forming a barrier resembling that of the Ross sea. The ridge of the ice-sheet continued its course to the south at a higher elevation than before, and was broken by a few nunataks. Reconnaissances were made with a view to the selection of a base station, and the barrier was followed for some distance until it took a north-westerly direction, and heavy pack was encountered. It appeared that the current brought the ice down along the edge of Coats Land and Luitpold Land (its newly discovered continuation), then bending west along the edge of the barrier and probably turning north in the direction of Graham Land, where great masses of ice must accumulate.

After repeated vain endeavours to find a more suitable spot, an ice-floe in Vahsel bay was finally chosen as the site for the winter quarters. Stores were landed and a house partly built; then bad weather intervened, and great masses of ice, including the floe on which the station was being erected, were carried away, leaving a broad expanse studded with ice-blocks and icebergs where the bay had been. There was now no shelter for the ship, and after some further attempts at landing on the ice-sheet had been made, it was at last decided, early in March, to return north to South Georgia, and reserve the strength of the party for a new attempt the following year. The ship had already been once caught in the new ice, and her course became more and more obstructed. On March 6 she was once more beset, becoming at last hopelessly imprisoned in old ice, and a drift began which lasted till November 26. The staff settled down to steady scientific work, so far as was possible under the circumstances. The magnetic observations showed this region to be remarkably free from disturbances, this according with a slight inclination for the latitude. Auroral displays were few, but optical phenomena in the domain of meteorology were abundant. The usual Antarctic fauna was observed.

Between June 23 and 30, the leader and two companions carried out a sledge expedition to the south-west, between 70° and 71° S., in search of the land reported many years ago by the American Morrell, and by him named New South Greenland. No trace of land was discovered, and the excision of this land from the map—at least, in the locality assigned to it—is one of the geographical results with which the voyage is to be credited.

Captain Vahsel, whose health had already caused some anxiety, now developed an old heart trouble and gradually became worse until death supervened on August 8. The drift took a somewhat circular course, to be explained as a result of the meteorological conditions of the Weddell sea, which forms a low-pressure area with cyclonic air-currents. Set free from their imprisonment, the voyagers continued their course to the north, again passing through heavy pack-ice, which gave place in time to an enormous number of icebergs. From South Georgia (reached on December 19) some of the staff took passage home direct, while after reaching Buenos Aires, Dr. Filchner lent the *Deutschland* to the Argentine Government for a new voyage to south Georgia in order to bring away the *personnel* of the meteorological station there. After undergoing repairs the ship will, it is hoped, be ready for a new southern voyage at the end of the year.

THE SOCIETY'S MEDALS AND OTHER AWARDS FOR 1913.

At the meeting of the Council on March 17, the award of the medals and other grants for 1913 was decided on as follows: With the approval of the King, the Founder's Medal is not awarded this year, but a casket, with suitable inscription, will be presented to Lady Scott, to contain the Patron's Medal and the Special Antarctic Medal awarded to her late husband, Captain R. F. Scott, in 1904. The Patron's Medal is awarded to the late Dr. E. A. Wilson, chief of the Scientific Staff of the British Antarctic Expedition of 1910–1913, who shared his leader's tragic fate during the return march from the successful sledge expedition to the South Pole. As is well known, Dr. Wilson had accompanied Captain Scott on his previous expedition of 1902–1904, and did excellent work in the study of the zoology of the region visited, especially in regard to the whales, seals, and birds. His skill as an artist was strikingly displayed during both expeditions, and added greatly to the value of his work.

Another award in connection with the same expedition is that of a gold watch, to be given to Lieut. Campbell in recognition of the ability and good leadership displayed by him as commander of the Northern Party, left, it will be remembered, to spend the long winter at Terra Nova bay with scanty resources, and to make its way in the spring to the base at Cape Evans—a distance of 230 miles.

The Victoria Research Medal is given to Colonel S. Burrard, F.R.S., C.S.I., Surveyor-General of India, who for many years has been a consistent supporter of every line of scientific inquiry connected with geodesy and geography that has been inaugurated in India, while as superintendent of the Trigonometrical Survey Office at Dehra Dun he was responsible for the success of the most important system of geodetic triangulation in which this country is interested. His works on the geography and geology of the Himalayas and Tibet (brought out in conjunction with Mr. Hayden); on the

attraction of the Himalayas on the plumb-line in India; and more recently on isostasy in the same part of the world, have gained him a wide reputation as a scientific investigator.

Of the other awards, the Murchison Award is given to Major H. D. Pearson, who has been engaged in survey work in the Sudan for about ten years, and who succeeded to the post of Director of Surveys in 1905. Apart from his administrative work in this capacity, he has done all in his power to promote the accurate mapping of this part of Africa, and an improved knowledge of its geography, and has himself contributed not a little to the latter during expeditions to outlying districts. The Gill Memorial is bestowed on Miss Gertrude Lowthian Bell, for her many years' work in exploring the geography and archæology of Syria, Mesopotamia, and other parts of Asiatic Turkey, and for the excellent works in which the results are recorded. The Cuthbert Peek Grant is awarded to Dr. Felix Oswald, for his scientific exploration in Armenia, the results of which were published at his own expense; and his more recent work in the region east of the Victoria Nyanza. Lastly, the Back Bequest goes to Mr. William S. Barclay, who has given to the Society the results of his studies and exporiences, firstly in Tierra del Fuego and Patagonia, and subsequently in the valley of the Paraná river, a region of great importance to the physiographic and economic development of South America.

SOME NEW AND IMPROVED INSTRUMENTS AND APPARATUS FOR GEOGRAPHICAL SURVEYING.*

By E. A. REEVES, F.R.A.S.

Tangent-Micrometer Theodolite.

For the determination of positions by astronomical observation as well as for triangulation, it is of course necessary that the geographical surveyor should be provided with a good transit theodolite; but on small expeditions the transport difficulty is at times very serious, and every ounce of weight has to be taken into consideration. I have frequently been told by travellers who have come to me for instruction, and who are ready and willing to do serious work, that a theodolite, so far as they are concerned, is out of the question. For this reason many men in earlier days turned to the sextant, as it was the only instrument for astronomical work that they could carry. With experience it is of course possible to obtain quite fair results, as regards latitude and time, with a sextant, and although these can never be expected to equal the accuracy of observations taken with a transit theodolite, they are better than many who have had little to do with the sextant often seem to suppose. In the hands of an expert the latitude resulting from the mean of two sets of north and south circummeridian observations taken with a good sextant should not be more than 5″ or 10″ in error, while the same observations taken with a micrometer 5-inch transit theodolite will give a result within 2″ or 3″ of the true latitude.

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* Continued from p. 271.

Still, it is not only altitudes of heavenly bodies that a surveyor has to observe; some of the most important of his observations are for azimuth and rounds of angles for triangulation, for both of which purposes the sextant is quite unsuitable where real accuracy is required.

Some few years ago I set to work to devise a transit theodolite that should meet the need of the geographical surveyor of the present day who desires to do reliable work, but who is unable to carry a heavy instrument, and yet must have one capable of giving accurate readings, which are out of the question with the small so-called "mountain" theodolites, of which several are on the market.

The result of my endeavours is the 4-inch transit theodolite with the tangent micrometers. This instrument has now been in use for a few years in various parts of the world, and is quite capable of really good work, in spite of its small size. As the instrument is not well known, and as it has recently been considerably improved in several respects, I propose first to give a brief description of its construction, and afterwards show what sort of accuracy can be expected from work done with it.

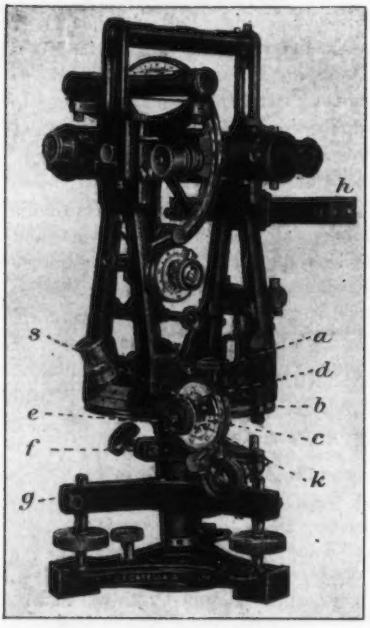

FIG. 11.—TRANSIT THEODOLITE WITH TANGENT MICROMETERS.

The essential points about a theodolite of this kind are that it should be (1) light and portable; (2) rigid and strongly made; (3) fitted with circles capable of giving accurate readings; (4) simple in construction and not easily put out of adjustment. All those conditions have received careful consideration.

As will be seen from the illustration (Fig. 11), except for the special micrometers, this theodolite differs but little in appearance from those in general use. The telescope, which transits in both directions, is of 8½ inches focal length, with a magnifying power of from 12 to 20 diameters. The principal level has divisions of about 10″ in value, which are subdivided into two equal parts. Instead of webs the diaphragm has extremely fine cuts on the glass, three of which are vertical and one horizontal; but so that the instrument may be used for subtense work, this diaphragm and eyepiece can be taken out and placed at right angles to its ordinary position, *i.e.* so that the three wires or marks are horizontal; and for this purpose they are so spaced that they subtend 1 in 100, that is, 1 foot on a rod held vertically at 100 feet distance is just included between two marks on the glass, thus rendering it possible to read off distances at a glance. Although small, there is nothing flimsy about the construction of the instrument, and it is extremely rigid for its size.

However, it is the special micrometer arrangement for reading the angles that

distinguishes this theodolite from other forms. Instead of four separate micrometers (that is, two on the vertical circle and two on the horizontal circle), as is the case with the usual pattern, and which project at a considerable distance from the instrument and make it somewhat bulky and inconvenient to pack in one case, besides being liable to be put out of adjustment, there is here only one micrometer on each circle, and this consists of a special arrangement of the tangent screw. Both A and B readings on the horizontal circle are read on the same micrometer, as are also the C and D readings on the one micrometer of the vertical circle. This arrangement greatly reduces the bulk of the instrument for carrying. Referring to Fig. 11, *a* is a clamp-screw of the ordinary pattern, and *b* is the tangent screw turned by the milled head *e* for making the exact contact of an object on the intersection of the cross-wires in the telescope. The tangent screw carries the pointer *d* as well as the micrometer drum, the central part of which, with the pointer, is rigidly attached to the tangent screw. The outer rim or dial *c*, upon which are engraved the numbers representing single minutes and tens or fives of seconds of arc, also carried by the tangent screw, is separate, and only attached to the central part by a spiral spring inside the drum. By means of this spring the outer rim or dial *c* is, in its normal position, kept with the 0, or zero, opposite the pointer *d*; but this is merely for convenience, and not at all an essential part of the arrangement. *g* is a clamp actuated by the lever *f*, by means of which the dial *c* can be firmly held in any position; and when this is fast, and the tangent screw (which is always kept about the middle of its run) is turned, the pointer can be revolved without moving the dial, and made to indicate any required number on the dial. The upper plate carries a fine pointer which passes from one division on the arc to the next in one complete turn of the pointer *d* round the micrometer drum, so that upon this drum small divisions of the arc, such as 10″ or by estimation single seconds, can be read.

Special care has been taken with the magnetic needle, *h*, which is one of edge-bar pattern 4¾ inches in length, and balanced on a sapphire centre instead of agate. The needle is reversible in all directions; and the sapphire centre can be taken out and put in on the opposite side, so that the needle can be turned upside down as well as end for end. This needle and its fixing has been arranged in consultation with Captain Creak, R.N., F.R.S., late Superintendent of Compasses to the Admiralty. A traveller can therefore with this little instrument take really useful observations of the magnetic declination.

The tangent micrometers have usually been made for the small 4-inch theodolite, but they can be fitted by the makers, Messrs. Casella & Co., to any other theodolite if desired. The weight of the 4-inch instrument is 11½ lbs., without the wooden case, which weighs another 6½ lbs. The tripod weighs 9 lbs. The total weight is therefore 27 lbs., or about 25 lbs. less than that of an ordinary 5-inch theodolite, packed in two cases, and the tripod.

Since the 4-inch tangent-micrometer theodolite first appeared some really good work has been done with it, and it has been used in many parts of the world.

Only a few months ago I received some excellent observations taken by Dr. Hamilton Rice in the upper Amazon region, in which the north and south star latitudes only differ by 1·5″ and the east and west stars by 0·6 sec. Several observations taken on different dates at the same place gave practically the same results. Mr. C. Clementi used one of these instruments, and his report of the observations taken on a recent journey through Central Asia is specially interesting.

With a 5-inch transit theodolite fitted with ordinary micrometers the latitude

resulting from a pair of north and south circummeridian stars frequently comes out within 2″ of the true latitude, and this 4-inch tangent micrometer often gives results not more than 2″ or 3″ in error, as compared with the Ordnance Survey.

As regards horizontal angles, I have added two sets of five readings taken between two points, first with the zero of 0° and then at 35°. For the first set the probable error of a single reading is 2·18″ and that for the mean of the set 0·58″, while the second set gives the probable error of 4·15″ for a single reading, and 1·85″ for that of the mean of the set. These readings were as follows:—

First Set, with 0° as Zero.

°	′	″			v				v^2
45	47	30	...	...	+ 4	...	...	...	16
		24	...	...	− 2	...	...	...	4
		29	...	...	+ 3	...	...	...	9
		24	...	...	− 2	...	...	...	4
		23	...	...	− 3	..	..	..	9
		5)130							42
Mean =	45	47	26						

$$\cdot 6745\sqrt{\frac{42}{4}} = 2\cdot 18'' \text{ (probable error of a single reading).}$$

$$\cdot 6745\sqrt{\frac{42}{5(5-1)}} = 0\cdot 58'' \text{ (probable error of arithmetic mean).}$$

Second Set, with 35° as Zero.

°	′	″			v			v^2
45	47	32	...	...	− 4·6	...	...	21·16
		30	...	...	− 6·6	...	...	43·56
		42	...	...	+ 5·4	...	...	29·16
		44	...	...	+ 7·4	...	...	54·76
		35	...	...	− 1·6	...	...	2·56
		5)183						151·20
Mean =	45	47	36·6					

$$\cdot 6745\sqrt{\frac{151\cdot 2}{4}} = 4\cdot 15'' \text{ (probable error of a single reading).}$$

$$\cdot 6745\sqrt{\frac{151\cdot 2}{5(5-1)}} = 1\cdot 85'' \text{ (probable error of arithmetic mean).}$$

With a 6-inch transit theodolite fitted with the tangent micrometers some of the best triangulation work of the sort that I have seen was done a few years ago, and in a quadrilateral figure none of the four triangles had a greater error than 2″, whilst in two of them the sum of the three angles came to 180 within a decimal of a second.

A 5-inch transit theodolite fitted with ordinary micrometers has been found to give a probable error of a single reading of two sets of five readings for the first set 2·16″, and for the second 2·3″, while the probable error of the arithmetic mean has worked out to be for the first set 0·94″ and for the second 1·62″.

Invar Tape Base Line.

The invar tape for base-line measurement may now be considered to have thoroughly established itself, and has practically superseded all other apparatus for the measurement of bases in triangulation on a geographical survey. It

is not necessary for me to describe it, as a great deal has been written about it in recent years. Owing to the coefficient of expansion being practically negligible, the fact that the apparatus is light and portable, that distances can be measured by it much more rapidly than by any other means, and measured over uneven ground, there can be no doubt that the introduction of M. Guillaume's invar tape marks a memorable epoch in the history of surveying. Sir David Gill has lately been giving his attention to the improvement of the method of suspending the tape on pulleys, and other technical points in connection with the apparatus, and a short account of this will be found in the *Geographical Journal* for January, 1912. Information on the measurement of bases by the invar tape will also be found in Mr. Hinks' paper in the *Geographical Journal* for August, 1911.

Photographic Surveying.

Photographic surveying has received considerable attention in recent years, both in this country and abroad; and although I cannot go into this matter at any length, it is necessary that I should say a little about it.

Up to the time of the introduction of the Stereo-photo method, which Dr. Pulfrich's stereo-comparator has made practically possible, photographic surveying consisted of taking photographs at the two ends of a measured base, or at several known points, and then having these properly oriented by the compass needle, or by means of other known points on the photographs, fixing the positions of the unknown points by intersection. In fact, this amounted to nothing more or less than plane-tabling from photographs in an office, instead of from points in the country. Quite a large number of photo-theodolites for surveying on this system have been brought out, of which the Bridges-Lee pattern, made first of all by Casella, is certainly one of the best and most practical. Altogether, in spite of drawbacks, a considerable amount of useful survey work has been done by this intersection method, specially in Canada and Central Asia; and indeed, it is quite possible to make good use of ordinary photographs for filling in detail in maps, provided the camera is carefully levelled, the lens is a good one, and its focal length accurately known. It is further necessary that means be provided for drawing on the picture the true horizontal and central vertical lines, and that the photographs should show at least three points of which the positions are accurately known.

However, it seems probable that in time to come the method known as stero-photo surveying will supersede these earlier intersection methods, as it should give more accurate results, and the plotting of the work afterwards from the photographs is far more rapidly accomplished. It is not necessary that I should give a lengthy explanation here of this system, as several such have appeared lately, and it was carefully described by Captain F. V. Thompson, R.E., in the *Geographical Journal* for May, 1908. Briefly stated, this method consists of taking photographs in the same vertical plane, at a measured distance apart, and viewing the negatives, or positive transparencies made from them, in a special form of stereoscope. The eye-pieces of the stereoscope are provided with exactly similar indices, which can be made to combine stereoscopically with any given point on the view by increasing or decreasing the distance between the slides holding the photographs. The amount of separation required for stereoscopic combination is a measure of the distance of the point from the plane in which the plates were exposed, and can be read on a suitable scale. The azimuth or angular measurement round the horizon of any point, as well

as its vertical height, can also be read by means of suitable scales, so that the position of the point is definitely fixed.

From the readings given on the scales of the comparator it is possible to plot the map by the ordinary method, but as this would be a lengthy process, so as to enable the plotting to be done more rapidly, experiments were made at the Chatham School of Engineering with a view to shortening it, resulting in an apparatus being devised called the Stereo-Plotter, by means of which the work of plotting is done to a great extent automatically. As the screws are turned which cause the images to combine in the stereo-comparator, various levers and arms are moved at the same time, which give the co-ordinates and position of the points on the map with very little trouble. In his description published in the *Geographical Journal*, Captain Thompson gives a map of the Keswick district made with the stereo-plotter, which, as regards accuracy, is on the whole satisfactory. The rate of the field work was 10 square miles per

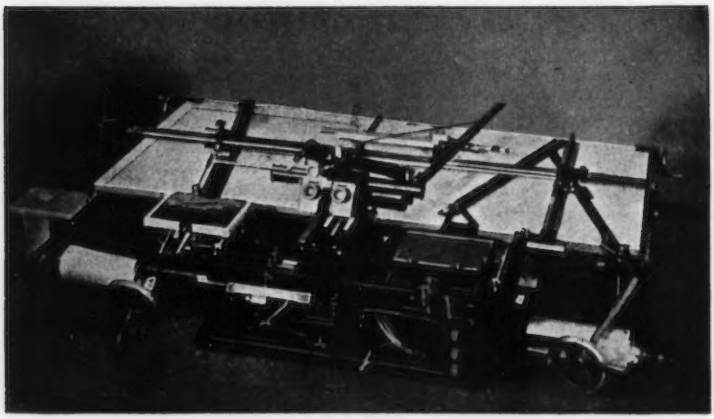

FIG. 12.—OREL'S STEREO-AUTOGRAPH.

day. One of the stereo-plotters is now being used by the Survey of India for surveying on the north-west frontier of India, and under the direction of Mr. McCaw, the Fiji islands have just been surveyed by this system, the results of which survey are now being plotted at the Ordnance Survey Office, Southampton.

It is not only in this country that experiments are now being made with stereo-photographic survey, but on the continent too a great deal of time and trouble are being devoted to the subject. Lieut. Ritter von Orel, the superintendent of the photogrammetric department of the Military Geographical Institute in Vienna, has devised a most ingenious instrument which he calls the Stereo-Autograph, and which to a great extent resembles the stereo-plotter, and has been constructed for the same purpose as that instrument, viz. that of reducing the labour and time of plotting the map from the stereo-photographs.

In some respects it is an advance on the earlier stereo-plotter, inasmuch as it is almost entirely automatic; gives heights and actually traces the contour lines upon the map. The stereo-autograph is shown in Fig. 12. I wrote a note on the stereo-autograph in the *Geographical Journal* for October, 1911, but those

desiring further information will find it in Lieut. Orel's descriptive pamphlet, published by the Military Geographical Institute of Vienna.

One drawback to the stereo-photo system of surveying at present is the great cost of the stereo-plotter, and the same applies to the stereo-autograph of Lieut. Ritter von Orel, which costs from £500 to £750. This places it altogether out of the reach of the ordinary surveyor, and means that he cannot plot his own map, but must send the photos to some Government department or institution where they have this costly apparatus, which is not always an easy matter practically. The camera required for the purpose of taking the photographs in the field need not cost more than £30 or £40, so that there is little difficulty about this part of the matter; but the plotting of the map afterwards is quite another question. Perhaps for the present the ordinary traveller who wishes to supplement his plane-tabling, and fill in detail by photography, will still continue to use some such instrument as the Bridges-Lee photo-theodolite, which has certainly been found very useful and practical, and to give fairly good results when the plotting has been done with care, even if it does take longer to carry it out.

Before leaving this subject I must just mention the system of mapping from photographs taken from a balloon by means of a special camera designed by the late Theodor Scheimpflug, of Vienna. By this method photographs are taken from known heights and positions of the balloon, and then the map is constructed on the principle of vertical triangulation, assisted by definitely fixed points in the photographs.

Photographic surveying, even in its improved form, must necessarily be limited and restricted in its application, although there are occasions when it proves valuable; but for ordinary geographical surveying it is not likely to supersede the usual methods.

Electric Charge for Bichromate Battery.

One of the greatest practical difficulties met with in star observation at night with a theodolite is the illumination for rendering visible the wires, or fine cuts on the diaphragm. The way in which this used to be done was by the well-known little lamp carried on a bracket and arranged so that the light passed through the hollow axis of the telescope bearing, and was then reflected down the tube; but this was most unsatisfactory, and an endless source of annoyance and error. Just at a critical moment the lamp would go out or flicker in the wind, so that it was useless, and many a good set of observations has been spoiled in this way. Besides it is quite a mistake to allow one side only of the theodolite to become heated, as is often the case when using this lamp. Several attempts have been made to improve the illumination of the telescope field, and one of the methods now in use is that of the small silver-plated ball carried by a bent wire, and fitted in front of the object glass; the ordinary lamp used for reading the circle can then be held so that light is reflected from the ball down the telescope. A better way still is to make use of the bored axis of the telescope bearing and the flat reflector in the telescope, but instead of the small oil lamp, have a little electric light bulb fitted on the bracket. This is excellent, but the difficulty experienced in out-of-the-way places is to get the electric light. Of course, charges can be carried or sent abroad, but it has generally been found that when they arrive and are required after a long journey, they are useless. Messrs Coates & Co. (121, Victoria Street, S.W.) have recently brought out a new charge for bichromate cells that seems to have met the difficulty, and from what I have heard, is quite satisfactory, and can be used in any climate. This charge consists of a dry powder carried

in an air-tight leaden tube. When the battery requires recharging, all that has to be done is to open one of the tubes, place the powder in a glass, and mix it with a certain quantity of cold water. The battery is recharged in this manner, and the lamp is immediately ready for use. The tubes of powder cost only about 8*d.* each, and will give a light for 18 hours. Quite a large number can be carried without difficulty. Only recently I received a letter from a traveller in South America, informing me that these battery charges which he took with him are proving most satisfactory. Acetylene lamps have also been used a good deal lately by surveyors abroad, but if the difficulties of recharging the battery are overcome, I feel sure there is nothing to equal the electric light.

Compasses.

As regards prismatic compasses, in spite of numerous improvements, suggested or actually attempted, perhaps the best for route surveying and mapping is still the large-size simple pattern made by Cary Porter, and others, and used by the R.G.S. The army service pattern is more generally serviceable, as it can be also used as an ordinary day or night marching compass, or for orienting the plane-table. However, for mapping it is well to have as large a ring as possible, specially when bearings of distant points are taken; and this is where the former pattern has the advantage.

An excellent little night-marching and prismatic compass combined is now made by Steward (of the Strand, London), and the ring and sights are rendered luminous by a composition of radium instead of ordinary luminous paint, the advantage of this being that it is not necessary that the compass should be exposed to daylight before being used for marching at night. This compass floats in liquid, and is therefore specially steady and suitable for use on horseback.

Sextant and Theodolite Observation at Low Altitudes.

The question has often arisen, specially lately in connection with polar matters, as to the relative value of theodolite and sextant observations of the sun taken at very low altitudes; and it may be of interest to show the results of observations taken with a latest pattern 6-inch sextant and mercurial artificial horizon compared with those taken with a 6-inch transit theodolite at the same time. The sextant observations I took myself, while an assistant observed the altitudes with the theodolite. I think the comparison is important, for it shows that even at such a low altitude as 3° the sextant and artificial horizon observations differ only by about one minute of arc from those taken with the theodolite. The artificial horizon was of the ordinary folding roof pattern; it was filled quite full with mercury so that the rim should not cut off the rays of light, and placed on the sextant box on the ground. The observations were then taken without serious difficulty by lying flat on the ground, with the sextant as close as possible to the artificial horizon. I mention this matter here, as it has often been stated lately that sextant observations of the sun taken at such low altitudes as 7° or so, are quite worthless, if not impossible; but this is by no means the case, and the observations if carefully taken are not likely to differ from theodolite observations to any serious extent. Of course the uncertainty of refraction is another matter, and would affect both the sextant and theodolite observations alike.

Sextant (Index error, + 1′ 5″).			Times.			Theodolite.				Level.		Mean (with level correction applied).		
°	′	″	°	′	″	h.	m.	s.		°	′	″	E.	O.	°	′	″
5	50	0	2	55	32	7	31	59	FL	C 2	56	3	10·5	10·5	2	56	10
										D 2	56	16					
6	28	30	3	14	47	7	35	27	FR	C 86	44	30	10·5	10·5	3	15	18
										D 86	44	55					
7	6	40	3	33	52	7	38	7	FL	C 3	34	35	10·5	10·5	3	34	52
										D 3	35	10					
7	48	40	3	55	7	7	40	46	FR	C 86	4	21	10·0	11·0	3	55	4
										D 86	5	8					
8	15	30	4	8	17	7	42	36	FL	C 4	7	30	10·0	11·0	4	7	52
										D 4	7	50					
8	41	10	4	21	7	7	44	17	FR	C 85	37	31	10·0	11·0	4	21	57
										D 85	38	11					
9	7	00	4	34	2	7	45	57	FL	C 4	33	2	10·0	11·0	4	33	23
										D 4	33	20					
9	29	50	4	45	27	7	47	30	FR	C 85	13	30	11·5	10·0	4	46	5
										D 85	13	56					
9	53	30	4	57	17	7	49	12	FL	C 4	57	36	11·0	10·5	4	57	27
										D 4	57	41					
10	19	50	5	10	27	7	50	50	FR	C 84	48	27	11·5	10·0	5	11	18
										D 84	48	45					
11	3	50	5	32	27	7	53	46	FL	C 5	32	50	11·5	10·0	5	32	11
										D 5	32	8					
11	32	10	5	46	37	7	55	19	FR	C 84	14	32	11·5	10·0	5	45	32
										D 84	14	59					
11	55	50	5	58	27	7	57	17	FL	C 5	57	50	11·5	10·0	5	57	43
										D 5	58	13					
12	15	10	6	8	7	7	58	45	FR	C 83	49	55	11·5	10·0	6	10	17
										D 83	50	6					

School Set of Surveying Instruments.

During recent years there has been a very great improvement in the teaching of all branches of geography in schools, and the elements of practical surveying and mapping now very properly form a part of the geographical course in many of the more advanced educational establishments of our land. I am frequently being consulted in connection with this subject, and find that one very real difficulty in the way is the cost of suitable apparatus and instruments. Naturally, the school funds will not often permit of the purchasing of a £30 transit theodolite, while a sextant and artificial horizon, dumpy level, tacheometer, and plane-table are beyond the reach of many, even if there is sufficient interest in practical geography to desire that this subject should form part of the school curriculum.

True it is that several praiseworthy attempts have been recently made to meet this want to a certain extent, but much more requires to be done. Some of the school models I have seen really resemble the proper instruments so little that it would be waste of time to teach a boy how to use them, for he would afterwards find that what he had worked with was not like the real things at all. What I think is required is a cheap set of school instruments that so far as possible resemble the real instruments, so that what a boy learns with these should not have to be unlearned afterwards when he comes to handle the instruments themselves, should he have to do so in later life. There is, I am glad to say, an increasing demand for such a set of school instruments, and I have recently consulted Messrs. G. Philip & Son, who have already done something

in this line, and from drawings and instructions I have given, they have now constructed a set of instruments which, so far as they go, resemble the real instruments themselves, and, what is most important, are extremely cheap.

Amongst these he will find here a transit theodolite, a sextant and artificial horizon, plane-table, dumpy level, with levelling staves, which can be used to show the principle of tacheometric measurement of distances, a prismatic compass, an aneroid barometer, and a measuring tape. The whole set complete can be purchased from Messrs. Philip & Son for £7 8*s.* 0*d.* The same set with a better theodolite, for those who care to pay more, is obtainable for £10 18*s.* 0*d.*

Of course it is not supposed that with such things it is possible to do more than teach the elementary principles of geographical surveying and astronomical observations for latitude, etc., but these instruments will, I think, be sufficient, in the early stages, and are quite strong and workable when ordinary care is taken in handling them.

Sir THOMAS HOLDICH (before the paper): From time to time, as instruments improve, it is necessary to take stock of new developments, particularly as regards the smaller class of instrument, and to-night we are going to listen to what I am sure will be a very interesting account from Mr. Reeves, who is specially able to deal with a subject of this sort, of the improvements that have been effected in those instruments you see before you and in others which he will show you. I will now ask Mr. Reeves to commence his paper.

Sir THOMAS HOLDICH (after the paper): I think Mr. Reeves has given us food for reflection which might very well last us over two or three meetings for further discussion. Still, I hope to hear a criticism or two on the subject of what he has said to us. Personally, I am glad to see that all the developments he has just referred to are in the direction of simplicity and the quickening of work in the field. To me personally, the most interesting subject which he has introduced is the determination of longitudes by means of wireless telegraphy. He has perhaps not experienced the great difficulty that usually attends the determination of an initial longitude by old methods, and, although I consider that of all the data with which a surveyor equips himself an initial longitude is perhaps the least important, still a longitude sooner or later must certainly be determined to give consistency to the whole work. But as for carrying an instrument like that before you into the field, I think it would be useful, after determining an initial longitude, only in correcting the results of differential longitudes determined chronometrically where there is no triangulation. We have almost always succeeded with light instruments, such as a 4-inch theodolite, in carrying some sort of triangulation into the field. Wherever there is triangulation of any value whatsoever I do not think the further determinations of longitude would be requisite, perhaps not even advisable. Referring to the little instrument Mr. Reeves has brought to our notice for determining altitudes from the plane-table, this is an elaboration of the well-known old clinometer. My own idea is that it is almost a little too intricate in construction. I admire the ingenuity of it, and where circumstances are entirely favourable I can quite imagine it may be used most effectively. But there are districts in which the plane-table has to be used where it may be subject to all sorts of vicissitudes from day to day and get a considerable amount of knocking about. I think it would be advisable for any one taking Mr. Reeves' instrument with him to equip himself also with one of the simpler sort less liable to come to grief through accident. I am delighted to hear about these watches, and I trust that we have at last succeeded in finding a watch which is impervious to wet. I remember I once equipped myself with

a most expensive and valuable watch for astronomical purposes. I happened, unfortunately, to tumble into the sea in the course of my voyage out to India, and I was never able to use that watch again. That was the end of it; so I hope we really have found an astronomical watch as impervious to salt water as to fresh. I should be glad of any criticisms on the subject of Mr. Reeves's lecture.

Sir DAVID GILL: I should like to say something in reply to your request for remarks, but the plain fact is that, if we are going to have any advantage in this Research Department from discussions of this kind, we must have much less material and much more time. I think we could spend two or three hours in the way of discussion and asking questions about one or two of the instruments, and to attempt to enter into anything like a general discussion on so many instruments would lead to no result. If we had taken levelling instruments in general we might have arrived perhaps at some definite conclusions, and particularly it would be valuable if, when any instruments are described here, it would be possible to let us have the actual results of field work done with them. For instance, in talking of the performance of a levelling instrument, to say that its probable error is so much per mile is hardly satisfactory; the principal error varies as the square root of the number of miles; thus, for example, if you get a probable error of a millimetre per mile, the probable error in 9 miles will only be 3 millimetres and not 9, or in 100 miles the probable error would be 10 millimetres —not 100. No mention has been made of Lallemand's level—*i.e.* the French system—which is the one we employed in the Geodetic Survey of the Transvaal and Orange River Colony. I should like to ask a great many questions about the Zeiss level; this is the first example of it I have seen, and I wish we had some diagrams of its construction. I hope in future we shall try in this Research Department to take up some one particular thing at a time, say levelling, or time determination, or plane-table work, and thrash it out; it is quite impossible to deal satisfactorily with so many things at one meeting.

Captain HENRICI: I would like to say one thing about the probable error of the levelling. The figures which Mr. Reeves gives are worked out for 1 mile on the basis that the error increases as the square root of the distance. The actual figures I have got for the probable error have varied from between 0·0015 and 0·0032 of a foot into the square root to the number of miles, the mean being 0·0023.

Captain LYONS: I quite agree with Sir David Gill that there are too many instruments before us to allow of any of them being thoroughly discussed. Of a new instrument we should like to know the points in which it differs from those of the ordinary type, what sources of possible error exist in it, what special advantages it offers, and what results have actually been obtained with it in practice. There is much that can be said about the Zeiss level on these points, and especially on the interesting reduction of error possible by the method of focussing employed. The Coast and Geodetic Survey pattern of level was introduced into Egypt six or seven years ago, and more recently into India, where it has given excellent results. These types of level in which the bubble can be read from the eyepiece of the instrument, enable simultaneous readings of staff and bubble to be made by the observer, who can work in an upright position. These advantages conduce to greater accuracy.

Sir THOMAS HOLDICH: I think that we must be all of one mind in one respect —we must sympathize with Mr. Reeves in his very plucky endeavour to condense a subject which might very well occupy weeks of discussion, within the ordinary limits of a single paper. He has shown us to-night what has been done in many directions for the improvement of instruments. We must endeavour to

rearrange our methods of discussions at these Research meetings, so as to exhaustively examine into the merits of some one particular proposition without fear of that mental indigestion to which Sir David Gill has referred. You will wish me, I am sure, to thank Mr. Reeves for what he has told us to-night. He certainly has given us plenty to think about.

Mr. Reeves: As was explained at the commencement of the paper, I have only given a summary of the more important improvements recently made in instruments and apparatus for geographical surveying, and there has been no attempt at exhaustive descriptions, although I think the instruments that are described for the first time have been pretty fully dealt with. In other cases reference is made to publications containing fuller accounts. I was asked to make a selection of the more important new instruments that I could exhibit, and give brief descriptions of these; and it is this that I have attempted to do. If I had been requested to give an exhaustive account of one instrument only, this could doubtless have been arranged. Detailed descriptions of special instruments are of course essential, as are also opportunities for fully discussing them; but to have taken up all the time allowed me to-day with one, or say two, instruments, would have deprived you of an opportunity of inspecting others of equal interest, some of which have never been exhibited in this country before, while others are entirely new.

With reference to the remarks of Sir David Gill in regard to the statement of level errors, I think there has been some misunderstanding. These errors have been computed from the ordinary square root formulæ. The confusion was probably due to my having to omit many pages and paragraphs in reading the paper, for want of time.

REVIEWS.

EUROPE.

Erosion in Holderness.

'The Lost Towns of the Yorkshire Coast.' By Thomas Sheppard. London: A. Brown & Sons. 1912. Pp. xviii., 329. *Maps and Illustrations.* 7*s.* 6*d. net.*

This small volume contains a wonderful amount of information in a most condensed form, for not only does Mr. Sheppard deal with the lost towns and villages, but he has aspired to write a monograph on the whole of the East Riding. His efforts have been so successful that it seems a pity he did not enlarge his volume and so have space to treat more adequately some aspects of the geography which are lightly touched on. The greater part of the volume treats of the subject of the title, and the historical evidence of the erosion of the coast of Holderness, while a few short chapters treat of the natural history, botany, extinct fauna, architecture, antiquities, communications, trade, etc., of the East Riding. The work is profusely illustrated, and particularly valuable is a series of reproductions of old maps, including one of the time of Henry VIII., which seems to have been overlooked by previous writers. It is of interest chiefly because it shows an island at the end of Spurn point. Unfortunately, a large-scale modern orographical map of the East Riding has not been given with the book; it would be a useful addition. The work makes a valuable companion to the late Mr. J. R. Boyle's 'Lost Towns of the Humber.'

'The Neighbourhood of Dublin.' By Weston St. John Joyce. (Dublin: M. H. Gill & Son. 1912. Pp. xx., 463. *Illustrations.* 7*s.* 6*d. net.*) Some twenty-five years ago the author contributed a series of illustrated articles dealing with the above subject to *The Evening Telegraph* and *Weekly Irish Times.* The notes he then made were necessarily much compressed, and he had a fund of information left in reserve to which he has steadily added year by year; and now in book form he gives an exhaustive account of every conceivable feature of interest in the environs of Dublin. It is a capital guide, giving ample directions for each little tour, and at the same time adding numerous details which tend to arouse in the reader a desire to follow in the author's footsteps; history, folk-lore, snatches of old songs, tales of smuggling, etc., all find a place, while over a hundred illustrations supplement attractively the information given. The two last chapters dealing with "The English Pale" and "Canals and Canal Travelling in the Last Century" are especially interesting. The reproduction of the time-table of canal boats about 1800 is most quaint and amusing, affording food for reflection on the rapid strides made during even our generation in modes of transit.

'England's Riviera.' By J. Harris Stone, M.A. (London: Kegan Paul. Pp. xii., 492. *Illustrations.* 15*s. net.* 1912.) It is difficult to keep pace with the avalanche of twentieth-century Cornish travel literature, Cornwall, like Brittany, being for some reason a highly popular quarry with tourists of literary proclivities. One of the latest is Mr. Harris Stone's volume which is described fairly accurately in the sub-title: "A Topographical and Archæological Description of Land's End, Cornwall, and Adjacent Spots of Beauty and Interest." Then, Cornish customs and folk-lore, described pleasantly and sympathetically, come within the author's purview. We have only come across one error in the whole book, but that is a curious one. Describing a certain monument in Helston, Mr. Stone quotes the inscription, but gives the wrong surname of the subject of the memorial, "Humphrey Millett *Crofts,*" whereas the actual name on the memorial is Humphrey Millett Grylls.

'Vorpommerns Küsten and Seebäder.' Von Dr. Max Friederichsen. Greifswald: Bruncken & Co. 1912. *Maps and Illustrations.* A sketch of the geography of Hither Pomerania, showing how the coasts have been moulded by natural forces since the Litorina period, to which is added a chapter on the bathing-places, their climatology, number of visitors, etc.

ASIA.

The Troad.

'Troy: a Study in Homeric Geography.' By Walter Leaf. London: Macmillan & Co. 1912. *Illustrations. Price* 12*s. net.*

Although some part of Mr. Leaf's matter is strictly topographical rather than geographical, and about a hundred and ten pages of his book, which describe the remains of antiquity at Hissarlik, are archæology, pure and simple, there remains quite enough to justify his sub-title. Long known as one of our foremost Homeric scholars and a protagonist in the literary warfare waged about the Homeric question, the author was prompted a few years ago by the reading of M. Victor Bérard's 'Les Phéniciens et l'Odyssée,' and still more by Sir W. M. Ramsay's remarks thereon, to consider whether the age-long controversy, which, debated from the study, threatened to become stale and unprofitable, might not be brought nearer solution by an intensive examination of the actual scene of the

Trojan War. Having twice paid flying visits to Hissarlik, he set forth again, in 1911, with the intention of remaining long enough in the Troad to see something of the whole district, and in particular of the other towns which appear either in the catalogues of Greek and Trojan allies, or in other parts of the Iliad, as neighbours of Troy. With the help and in the company of Mr. Hasluck, of the British School at Athens, he effected his purpose, and the result is before us.

The book is confined to strictly Homeric questions. What Mr. Leaf saw and noted outside the Homeric scope was communicated to the *Journal* last year, and the survey under notice now does not cover more than the western Troad bounded roughly by a line drawn from the northern mouth of the Dardanelles to the head of the Gulf of Adramit; but some notes are added (*e.g. à propos* of the Catalogue of the Trojan Allies) concerning places and peoples further east. What Mr. Leaf has to say on the topography of the Trojan plain hardly comes within the scope of this *Journal*, except, perhaps, in so far as it concerns the courses of the rivers. He votes for a more western location of the ancient Scamander than Schliemann's and Dörpfeld's course, and holds that, despite one explicit statement in the *Iliad*, the Simois never joined it. His main reason is the well-known difficulty of the ford. The Scamander, if it flowed far east of the present Menderes, down the courses of the modern Kalifatli and Asmak, would have had to be crossed often by the fighting armies, and yet there are few or no indications in the *Iliad* that a ford was crossed by attacking or retreating parties. About this point we will say no more than this: the high probability demonstrated by Mr. Leaf that the *Iliad* was written from personal knowledge of the scene does not in the least entail equal probability that the record of *events* on that scene was, or was ever intended to be, exact. Much of the story of the fighting, with its single combats, its intervention of the gods, its miraculous concomitant events of one sort or another, is so obviously fanciful, that, for our own part, we cannot see why so great importance should be attached to the presence or omission in this or that episode of the notices of the Scamander ford, or of the much-debated wall, or of any other fact. Mr. Leaf seems to us still to be asking too much of a heroic epic poet, something much too near, in fact, to his own standard of consistent accuracy, though, it must be allowed, he asks a good deal less in this book than in previous works on the subject.

The author's surveys, both of the southern Troad and of the Hellespontine coast, have been fruitful. He throws equal light on Achilles' raid and on the problems of the ferry from Asia to Europe. He discusses the sites of all the Homeric towns west of the Ida with full knowledge of the authorities, and offers a reasonable location for each; and his careful examination of the conditions under which sailing-boats cross from Abydos to Sestos and return, coupled with his exposition of Strabo's *locus classicus* on the subject, places all ancient geographers in his debt. In this Homeric field, so much trodden, he is conspicuously appreciative of his predecessors—except, perhaps, of Prof. Myres. To our mind, Mr. Leaf is not altogether fair to the latter in the somewhat severe note appended to p. 332. When we came to it, we were pulled up short by the stress laid on Strabo's error concerning Larisa, and turned back to p. 208, remembering that the question of the visibility of this town from Troy had been treated there as a loose statement, but a statement none the less of fact. What is sauce for the goose is sauce too for the gander, is it not? And if Leleges are not said to live in Pedasos in one passage of the *Iliad*, they certainly are placed there in another. Nor does Mr. Leaf's argument about lee shores lying in the direct line between the Dardanelles and Crete dispose of the possibility that drift carried ships from one to the other. The Hellespontine current, after

passing through the Doro channel, certainly sets southward, and has plenty of sea-room between islands to carry drift clear to Crete.

D. G. H.

Seistan.

'Seistan: A Memoir on the History, Topography, Ruins, and People of the Country.' By G. P. Tate. Calcutta: Superintendent Government Printing. 1912. *Price* 48*s*.

For the present, and, as we may well believe, for some time yet to come, the last word on the subjects of the geography, history, and ethnology of the Persian frontier district of Seistan has been said by Mr. G. P. Tate of the Indian Survey Department. No one could be better qualified than Mr. Tate to say that word. Not only has he been intimately connected with recent boundary demarcations in that district, but he possesses an invaluable faculty for evolving from native historical records all, or nearly all, that is worth preserving of the ancient and complicated story of an uninteresting country and people who have never figured prominently in Asiatic history or seriously affected the current of political action. It is only from the political and military point of view that Seistan has assumed importance lately. It lies, more or less, on the road from Herat to the Indian frontier in Baluchistan, and it is the possible use that might be made of Seistan in the event of aggressive action on the part of Russia that lends to that unattractive country an importance which it possesses in no other way. All the more credit to Mr. Tate that, leaving politics and military strategy severely alone, he has given to the public a book which is a monument of patient research and of most excellent illustration.

The very early history of Seistan, when it was but an unimportant item in the huge list of Persian satrapies, is one which none but an oriental enthusiast can follow with profit. It is an ever-changing story of political intrigue and turmoil where the figures flit hither and thither about the stage with most confusing rapidity. Not even Mr. Tate can evolve a really interesting and connected tale from that wild welter of historical episode. The history of Seistan really begins to take instructive shape from the time when those provincial rulers of most ancient lineage, the Kaiani Maliks, commenced their rule. This was late in the fourteenth century, and from that time onward we can perceive the growing importance of Seistan in direct relation to Herat. This relationship is well illustrated by Mr. Tate. Even from the earlier days of Mahmud of Ghazni, Herat and Seistan seem to have been jointly the objective of military irruption on the part of Asiatic conquerors. In the thirteenth century, when the Monguls overran Khorasan, Herat and Seistan were bracketed together. No part of this history is more instructive than that which deals with the destruction of Herat by Chenghiz Khan in 1221 and later (in 1384) of Zahidan (then the capital of Seistan) by Timur. The latter story is told with considerable dramatic force. In both we have something of a new light thrown on the action of Mongul and Tatar, who have hitherto been held up as monuments of Asiatic savagery in their military methods. We learn that there was often consideration almost amounting to leniency shown towards invested or captured cities, and that it was usually the treachery of the conquered which led to final reprisals and wholesale slaughter. The Mongul is clearly not quite so black as he has hitherto been painted, and it is Mr. Tate's brush that has laid on the whitewash. The Kaianis were never really independent again after the visit of Timur, but it was left to Nadir Shah in the eighteenth century finally to efface all vestiges of independence and to reduce Seistan to its present

condition as a land of widespread and most amazing ruins. Too much cannot be said for the excellence of the illustrations either as photographs or maps, the geographical and ethnographical sections of the work being equally well illustrated with the historical; but exception might be taken to the clumsy shape of the book which is in two volumes of the size adopted by the Indian Survey Department for special reports.

T. H. H.

Isostasy in India.

'Survey of India. Professional Paper, No. 13. Investigation of the Theory of Isostasy in India.' By Major H. L. Crosthwaite, R.E. Dehra Dun: 1912.

In Professional Paper, No. 13, of the Survey of India, Major H. L. Crosthwaite discusses the theory of isostasy as applied to India in order to ascertain whether the condition of approximate equilibrium of the Earth's crust which has been termed isostasy exists in India.

The investigation was made according to the method employed by Hayford and published by the United States Coast and Geodetic Survey in 1909, 1910, and 1912, and, following him, 113·7 kilometres is taken as the depth at which isostatic compensation is probably complete.

The paper contains the topographic deflections in the meridian which were computed for 102 latitude stations, and for those in the prime vertical computed for 18 longitude stations; from these are deduced the differences between the deflections computed on the hypothesis of uniform isostatic compensation and the observed deflections applied to the Clarke-Bessel spheroid. These differences or residuals are much larger than those found by Hayford for the United States, so it would seem that the isostatic conditions in India are not yet attained, and it is suggested that in and near the Himalayan region the crust is still in a state of strain and has not yet reached equilibrium. The concluding statement that only results are presented in this paper, and their discussion is reserved for a future occasion, disarms criticism, but in a publication of this nature so brief a statement as we have here is not a little inconvenient to the reader, since he has to consult other works in order to gain a correct appreciation of the results which are set forth. Nothing is said of the degree of reliability of the residuals obtained, and probably this has been left for the future discussion, but the omission is inconvenient. The nine regions adopted are those in which the astronomical observations for latitude were arranged in vol. 13 of the Surveys, but a short description of each of them in the present paper would have relieved the reader of the necessity for referring to the other work. The result of imperfect compensation is briefly compared with that obtained in America, but a fuller summary of the conclusions reached in similar work in other parts of the Earth would have been a welcome addition.

H. G. L.

Early Chinese Trade.

'Chau Ju-Kua: his Work on the Chinese and Arab Trade in the Twelfth and Thirteenth Centuries, entitled *Chu-fan-chï*.' Translated from the Chinese and annotated by Frederick Hirth and W. W. Rockhill. St. Petersburg: Printing Office of the Imperial Academy of Sciences. 1912.

Prof. Hirth, of Columbia University, New York, in contributing his share to this valuable and interesting work, is no novice in the matter, but returns to a familiar subject as to an old love; he has been publishing articles and pamphlets, some in English, others in German, off and on at any time within the past

twenty years, and he has already told us in the main what he now recounts, with a little more embellishment and Indo-Arabic research, in the volume before us. As to Mr. Rockhill, he is, of course, widely known as one of the very few first-hand authorities upon Tibet and the Tibetans; but of late years he has also improved his opportunities at Peking in the field of Chinese commercial literature, and has thus given ample proof of his capacity as a "double-barrel" man. In this work upon Chau Ju-kua it is not easy to discern the respective shares of two contributors, and the difficulty is occasionally intensified by the presence of an "I" which has inadvertently been overlooked in the proof-reading, when a "we" or an individual name in brackets would have been more consistent. On the whole, it may be assumed, however, that the bulk of the translation work and enthusiasm is Dr. Hirth's, and that the caution, discrimination, and application of brake-power is more largely Mr. Rockhill's.

The subject of the Chinese relations with the world by sea is an intensely interesting one, and it is curious to reflect that they knew much more, much sooner, about Indo-China, the South Seas, and India than they did about Lu-kiu, Formosa, the Pescadores, and even Japan. The reason is simple: they could hug the coast all the way to Singapore and Calcutta (or their ancient equivalents); and even from Sumatra to Ceylon they had the Nicobars, Andamans, and other miscellaneous islands to serve as marine milestones and *points de repère*. From first to last, almost down to our own times, they regarded the South sea, or Indian ocean as we call it, as being bounded by continuous land from Canton to Zanzibar; regarding the Red sea—if they ever clearly recognized it at all—as a mere creek or river-mouth on the north coast of the one and indivisible South sea. Japan, certainly, was known (more or less contemptuously) by land through Corea; but the sea trade with Japan, so far as it existed, seems to have been a private, if not secret, perquisite of the merchant class, and for 1200 years or so of little concern to the successive Chinese governments. On the other hand, the vasty deep, with its dangerous currents and typhoons, made a complete mystery of Formosa up to the very time of the Dutch arrivals.

Just as in High Asia the Chinese were first impelled west by a desire to form alliances against their arch-enemies the Huns (*i.e.* the early Turks), and by an itching curiosity to know more about Buddhism as derived through Turkistan from the Punjab and Afghanistan, so on the high seas they were impelled in the same westerly direction by a desire to check Indo-Chinese aggression on their southern frontier, to form alliances, create diversions, and to exchange sympathetic and literary views with the centres of Buddhism in India, Ceylon, and other places. It must be remembered that the Chinese were originally a northern power, and knew almost nothing of the country south of the River Yangtsze until the time when the First Emperor (B.C. 213) united feudal China under one centralized administration, taking possession of the Shan, Annamese, and other kingdoms. Previous to that, it had for centuries been doubtful (as Confucius himself admits 300 years earlier) whether Old China would become Tartar or not: some parts of her were unmistakably Tartarized. There had certainly been a few excursions from and to the South seas, and from and to High Asia before that unifying event, but practically China's eyes and ears were opened in both directions at one and the same time, though she was much slower in developing her sea discoveries than those made by land—say three centuries slower.

The subject is not a new one to the Royal Geographical Society, under whose auspices, it will be remembered, Colonel G. E. Gerini published, about four years ago, a valuable monograph of nearly one thousand pages, entitled

'Researches on Ptolemy's Geography of Eastern Asia.' He really treats of much the same subject that Messrs. Hirth and Rockhill discuss, and these two gentlemen, of course, give due credit to his industry, if they are not often able to accept his sanguine and even startling conclusions. The fact is, the whole subject is still in its infancy, and it is not desirable to labour it with too much talk. Periods must not be mixed, and there must be more discrimination in gathering evidence, in the admitting and weighing of evidence, and in argument upon the evidence. The subject will never be made plain to the man in the street until we start fair from the beginning, both from the Phœnician or Roman side, and from the Chinese or Indian side. The present writer's speciality is, of course, China, and not Arabia or India. Take, therefore, the Chinese side as an illustration. We want secular maps, rather than subtle arguments and forced comparisons of sound. We want, first of all, a map showing what China knew of the South seas previous to A.D. 1. Then we want a map for each dynasty subsequent to that, showing the conquests and advances of the cessions and divisions made; the names and extents of each country (shaded to show their chief productions); the changes in the names and areas of the states; the extent to which Hindu and (later) Arab influence was wholly or partly supreme; the distances between ports; the names of rulers; with the winds, tides, promontories, and so on. When we have got all this (and not before), we want similar Arab, Roman, Indian, Singhalese, Burmese, and Siamese maps, either native, or made up from native chronicles, *exclusively* from each separate country's point of view, dealing with ascertained facts, and not speculation. When we have these maps in front of us, we have nine-tenths of the evidence plump and clear before our eyes: then, and then only, will it be time to compare full notes and to split hairs. At present things are in a hopeless jumble, similar to the condition of Turkish history until, some twenty years ago, bilingual Turko-Chinese monuments were found *in situ*, enabling us to clear up practically the whole subject. Messrs. Hirth and Rockhill have now done excellent pioneer work in this direction; but two centuries are not enough: we must begin from the beginning, and exhaust all that each period can tell us alone.

E. H. P.

'Scinde in the Forties: being the Journal and Letters of Colonel Keith Young, C.B.' Edited by A. F. Scott. (London: Constable & Co. 1912. Pp. xvi., 201. *Map and Illustrations.* 12*s.* 6*d. net.*) A slight but interesting record of administrative life in Scinde after its conquest by Sir Charles Napier. Colonel Young arrived in India shortly after the decisive battle of Miani, 1842—that victory which was announced by Sir Charles in the historic punning despatch, "*peccavi.*" For ten years he worked unsparingly for the pacification of the new province, first under its conqueror and then under Sir Bartle Frere.

'Die Kolonisation Sibiriens.' Eine Denkschrift von P. A. Stolypin und A. W. Kriwoscheïn. Einzige berechtigte Uebersetsung von Carl Erich Gleye. (Berlin: Hermann Paetel. 1912. 5 *m.*) During the first three centuries of the Russian occupation of Siberia four and a half million Russian immigrants settled in the country, while in the last fifteen years three millions more entered, half of these in the years 1907 to 1909. In the year 1910 there was a considerable reduction in the number, partly because the crops failed in Siberia while there was a good harvest in European Russia. There is no doubt, however, that the state organization has not been able to cope with the great flood of immigration, and this book deals with the transport of immigrants and their settlement on the land, laws relating to the acquisition of farms, loans, etc.

AFRICA.

Christian Antiquities in the Nile Valley.

'Christian Antiquities in the Nile Valley: a Contribution towards the Study of the Ancient Churches.' By Somers Clarke, F.S.A. Oxford: Clarendon Press. 1912. *Maps, Plans, Sections, and Sketches. Price* 38*s. net.*

The Christian antiquities in Egypt and Nubia have been overshadowed in interest by the greater magnificence and age of the temples; but they are well worthy of study, and this is a welcome contribution to a comparison of the plans and architectural features of the churches of early Christian times. The remains, which appear to be in many cases fast disappearing, show that Christianity at one time prevailed from the Mediterranean to Sennar. Mr. Somers Clarke mentions, on the authority of Mr. Crowfoot, late Inspector of Antiquities in the Sudan, sundry remains of churches on the Blue Nile at Alti, Rodis, Kasemba, Arbagi, Hassa Hissa and Sennar; also at Katena on the White Nile; though he gives no particulars of any of these. How much further early Christian influence may have extended may be discovered by future explorers, and the author gives some suggestions which may be useful to them. He alludes to the difficulties of nomenclature in a semi-civilized country, and the varieties of transliteration from Arabic. These difficulties are emphasized in this work, for the place-names in the text are sometimes quite at variance with those on his rough sketch-maps, and it is not easy to identify some of his churches with those examined by Mr. Geoffrey S. Mileham, in his 'Churches in Lower Nubia,' 1910, or those mentioned by other travellers.

The churches in Nubia are of two types—basilican and domed; and there is a third type, found only to the north of Aswan, covered with a number of small domes. These types would seem to indicate different periods of construction, of which the basilican is probably the earlier. The basilican style would come with Greek influence; the dome, perhaps, from the Arabs? Beyond the suggestion that the third type is later, Mr. Clarke does not discuss the age of these buildings, nor does he deal with the inscriptions, which would doubtless throw light on this question. His data and series of plans and sections, however, form a starting-point for further inquiries.

F. A. E.

A French African Pioneer.

'La Fondation de la Colonie Française de la Côte d'Ivoire.' Par Fred Bullock, F.R.G.S. London: "Courier de Londres." 1912.

This little work is written with the view of doing somewhat tardy justice to the memory of a meritorious pioneer, whose services towards the establishment of French influence on the Ivory Coast in the eighties of last century seem in some danger of being forgotten. The early death of the promising French traveller, M. Treich-Laplène, before any full narrative of his journeys had been given to the world, is, no doubt, partly responsible for this. The author of the present work has evidently spared no pains to obtain all the most authentic information on the subject, and has had the advantage of access to unpublished papers placed in his hands by the explorer's family. He shows a sincere desire to establish the simple truth in the matter, and to substantiate every statement by unimpeachable authority. He is able to follow the young French official step by step in his patriotic and far-sighted efforts to secure that part of Africa for his country, at a time when the race for territory on the part of European Powers was at its height; showing how it was to his untiring energy, maintained

in despite of much discouragement and repeated and severe illness, that France secured a frontier, defined, in fact, by the course of his journeys in the previously untraversed interior. It may be recalled that, had it not been for Treich-Laplène's successful negociation of a treaty with the King of Bonduku, France could hardly have maintained her claim to that district in the teeth of English rivalry—the British emissary arriving only a few days after the bargain had been clinched. The part played by him in the revictualling of M. Binger's expedition, and its escort to the coast when that explorer was stricken down by illness, also deserves to be remembered. By his tact and forceful character the young Frenchman had gained a surprising ascendancy over the native mind, and it was, no doubt, to these qualities that his success was largely due. Mr. Bullock seems certainly to have made out a strong case in support of his thesis that it is to Treich-Laplène that the title of Founder of the Ivory Coast Colony by right belongs.

AMERICA.

The Labrador Eskimo.

'Among the Eskimos of Labrador.' By S. K. Hutton. London: Seeley, Service & Co. 1912. *Maps and Illustrations.* 16*s. net.*

No better book than Dr. S. K. Hutton's has been written on the intimate life of the more civilized communities of this race. The author, who belongs to the Moravian Church, spent some years in the Mission settlements on the coast, and from his extended experience he presents to his readers a clear and deeply interesting picture of the Eskimo and their existence through the often beautiful but always mosquito-haunted days and nights of the brief summer, and during the dark days of winter. He speaks with knowledge, for, to use his own words, "they are a people among whom I have lived for some years past, and with whom I have come into the closest contact: in their homes, in their work, in their hunting and their journeys, in sickness and in health."

Dr. Hutton writes of the Eskimo, "a kindly and hospitable people," with admiration and liking, and gives many an instance also of their powers of endurance and dogged courage in face of the tremendous difficulties that constitute the struggle for life against Nature in the Arctic. Yet sincerely as he admires the fine qualities of the Eskimo, he makes it quite clear how much they owe to the work of the Mission, for among "the People," as the Eskimo call themselves, there "are no prisons, and no police, and practically no serious crime." Yet at one time in the past, their language contained no word to express forgiveness, and their savage warfare with the Indians is a matter of history.

Dr. Hutton has made the most of his opportunities, and has shaded in every detail with faithful skill. His book is a mine of good stories, and he has the power to make little Johannes, "the great pathfinder," and the big and burly Julius with many another of their fellow-countrymen live before the reader's eyes. Dr. Hutton's work does not open new ground in a geographical sense, but for those who wish to realize the life of a primitive and adventurous people and the great work which the Moravians are doing amongst them, it will have strong attraction. The daily life of the only doctor living permanently, winter as well as summer, on the northern coast, whose practice extended along some 400 miles of the Arctic shore-line, is full enough of incident and adventure to be always facinating reading. The tale of long and desperate journeys of 70 or 100 miles undertaken at a moment's notice, through snow and blizzard, at the call of the suffering, form a fine record, and it is safe to say that all those who read the book

will lay it down with a feeling of sincere admiration for its author and the devoted men and women whose simple and noble story it tells with so much interest and modesty.

H. H. P.

Hearne's Journeys in North America.

'A Journey from Prince of Wales's Fort in Hudson's Bay to the Northern Ocean in the years 1769, 1770, 1771, and 1772.' By Samuel Hearne. New edition, with introduction by J. B. Tyrrell. Toronto: Champlain Society. 1911.

The Champlain Society has been well advised to undertake a re-issue of this famous book, now somewhat scarce, and has been fortunate in securing the services of so competent an editor as Mr. Tyrrell. The region covered by the journeys has been so neglected since Hearne's time that it is to be doubted whether any other living traveller possesses the personal knowledge of the country necessary for the adequate elucidation of the routes followed, and other points on which the reader needs assistance. For, as in other publications of the same Society, it is a critical edition rather than a mere reprint that is aimed at. Mr. Tyrrell's contributions consist, firstly, of a judiciously brief introduction setting forth the circumstances of the journey and the nature of Hearne's claims to recognition as a traveller and writer, and, secondly, in copious footnotes, in which such questions as the direction of the route, and relative accuracy of the mapping in the different parts of the area traversed, are fully discussed.

As is well known, Hearne's latitudes were greatly at fault in the more northern part of the third and most important journey, his "farthest" being pushed much to the north of its true position. But Mr. Tyrrell finds the mapping on the second journey much less deserving of censure, and he accounts for the inferiority of that on the third by supposing, either that the Elton quadrant taken on that journey was useless, or that Hearne neglected to use it during his forced march north with his Indian companions. The outward route can be followed with comparative ease, and the editor's own maps of the region are a useful aid in tracing it. But, as he remarks, further exploration of the country between the Great Slave lake and Lake Athabasca, where Hearne has hardly been followed down to our own day, is needed before his route in this section can be fully understood. It is hardly necessary to state that, like previous commentators, Mr. Tyrrell has no doubt that the Athapuscow of Hearne is the Great Slave lake, not Athabasca, the term being apparently a generic one for swampy deltaic country. It is interesting to find that the identification is confirmed by Hearne's description of one of the lake fishes—evidently the *Stenodus Mackenzii*, peculiar to the Great Slave lake.

Hearne's allusions to plants and animals are elucidated in a series of footnotes for which Mr. E. A. Preble, of Washington, is responsible. There are a number of reproductions of maps and photographs in addition to those of the original edition. Hearne's was one of the most readable of the early narratives, and his portrayal of the daily life of his native associates is even now of value. The work was therefore well worth resuscitating by the present excellent edition.

E. H.

OCEANOGRAPHY.

North Pacific Ocean.

'A Study of the Salinity of the Surface Water in the North Pacific Ocean and in the Adjacent Enclosed Seas.' By Austin Hobart Clark. Smithsonian Miscellaneous Collections, vol. 60, No. 13, 33 pp.

In this paper Clark gives an account of the salinity observations made by him during the 1906 cruise of the *Albatross* in the coastal waters of the extreme

North Pacific ocean, from San Francisco on the American side to the Korean strait on the Asiatic side, including observations in the Bering, Okhotsk, and Japan seas.

The water samples were collected each day at 8 a.m. and 8 p.m. at the surface, and from a depth of 4 feet below the surface, simultaneously; and the densities were determined when the ship reached a harbour or quiet anchorage. Figures representing the density of the water are employed, rather than the amount of dissolved salts in parts per thousand, so as to be more readily comparable with previous records for the area under consideration, which are almost all so expressed. The densities are all reduced to the standard temperature of 60° Fahr. (15·56° C.), and they therefore vary directly as the salinity.

A correction of 0·00175 had to be applied to the actual readings as the instruments were not standardized before being used.

Makaroff, of the Russian Navy, had made very many observations on the density and temperature of the North Pacific, and had also summarized the work done by others. Clark now fills up some blanks for certain localities for which there are no previous records. On the west coast of Nipon (Japan) he found indications of a belt of water of comparatively low salinity near the coast, probably a very thin and superficial layer resulting from the drainage from the land intervening between the heavy water of the eastern part of the Sea of Japan and the shore-line. Similar conditions were found on the west coast of Yezo. In the southern and south-eastern part of the Sea of Okhotsk there was a local area of high salinity near the Kurile chain. In the Bering sea, water with the comparatively high density of 1·0250 is mostly confined to the deep western part, probably because the broad deep channels between the Commander and Western Aleutian islands allow of the passage of great quantities of Pacific water, while further to the eastward the islands are larger and the openings between them too small to admit of the passage of much water. Clark considers that this area of high salinity [is due to an intermittent flow from the Pacific, there being a yearly pulsation in the flow of the surface waters of the North Pacific through the Aleutian islands due to a variation in the level of that ocean, reaching a maximum in November and a minimum in March.

Albatross records indicate a seasonal variation in the salinity of the water off the Californian coast. In summer the isohalines bend abruptly to the northward upon reaching the vicinity of the Californian coast and run more or less parallel with the shore, nearly to Puget sound, while in winter the isohalines run to the coast almost along the parallels of latitude. According to Thorade, the isotherms in the same region bend abruptly to the *southwards* in summer and run east and west in winter. These phenomena are due to the upwelling of cold saline abyssal water along the Californian coast in summer, this upwelling decreasing and practically disappearing in winter.

The account given in the paper of the conditions off the coast of California and in the Bering sea is new, and the summary of the conditions in the North Pacific gives English-speaking readers the gist of what has hitherto been published on the subject, but the value of the paper would have been much enhanced had there been a map showing the route and indicating the stations at which observations were made.

GENERAL.

The History of Exploration.

'A History of Geographical Discovery in the Seventeenth and Eighteenth Centuries' (Cambridge Geographical Series.) By E. Heawood. (Cambridge: University Press. 1912. Pp. xii., 475. *Maps and Illustrations.* 12*s.* 6*d.*)

In the first lines of his preface Mr. Heawood points out that the period with which he deals "lies for the most part outside what has been well termed the Age of Great Discoveries." It has met, as he continues, with less attention than it deserves. In general histories of explorations, once the story of the Great Age —the sixteenth century—has been told, it is not infrequently found that the narrative tends to degenerate into a succession of detached episodes, which, even if well chosen, result in exaggerating the fame of some few travellers at the expense of others. More than once in Mr. Heawood's history we happen upon an intimation to the effect that the fame of such an one has been allowed undeservedly to eclipse that of certain other workers in the same field. Students of the history of geography owe Mr. Heawood a debt of gratitude on several counts for his close and laborious study of the period he has chosen, and on this count, perhaps, primarily—that he has assigned to each branch of the subject and to each traveller whose work he details a carefully proportioned treatment. This instance may be cited: Dirk Gerritsz's voyage, on which he was stated to have reached 64° S., has so often been discussed at considerable length that his name has become quite as well known as if he had certainly attained that latitude, instead of having pretty certainly not done so. In a study of geographical method of the time such detailed investigation may be necessary; in a history of exploration as such it is unnecessary, and Mr. Heawood does justice to the matter in four lines.

Down to the period when Columbus, Da Gama, Magellan, and their followers marked out the great main routes of exploration overseas, it is possible to depict the story of exploration in some approach to a single chronological perspective. As branch routes began to be laid down, it becomes impossible to continue this method; certain fields of exploration must be demarcated for individual treatment, and the demarcation is not so simple as it may appear at first thought. Should the historian (for example) place the exploration of the Arctic lands of America and the Old World under the general heading of the Arctic region, or distribute it continentally? Many such problems present themselves, and Mr. Heawood's preface may be quoted again as showing that he felt the difficulty of the whole question. So far as his period is concerned, he has demarcated his fields, but has not dealt with the whole two centuries' history of each of them successively; instead, he has also created certain divisions of his period, in accordance with certain changes of aim and method in exploration generally. The author's unit of treatment is thus primarily one of time, and only secondarily one of place, and he has worked out this system with an eye to obtaining the best historical effect. That the story, for any individual field of exploration, should be broken up, is, of course, inevitable: the suitability of the system to the subject and the period is less a question for criticism than a matter of taste. It may safely be said that at any rate no better compromise could be devised between the extremes of strict chronology throughout and strictly local treatment, field by field.

It is of interest to observe the proportional area of these fields, or, in other words, to enquire what proportion of the book is devoted to any given field. The

immense importance of the Pacific field emerges at once: if voyages into "South Seas" generally be included (as at this period they reasonably may), it occupies roughly a third of the whole work. This feature gives occasion for another tribute of gratitude to the author, for the exploration of the Pacific as an individual subject is markedly neglected in geographical literature. A critical study of work in this field is accompanied by considerable difficulties in the way of identifying the precise routes of many of the voyagers, and often the particular islands for the discovery of which this man or that deserves credit. Some navigators took little or no account of the work of those who had preceded them, whether through ignorance, indolence, international rivalry, or the mere fact that the determination of positions was often imperfectly carried out. It is thus that individual islands came often to be renamed, sometimes more than once. In the latter half of the eighteenth century a period of special activity in Pacific exploration began: it has been termed the period of re-discovery on the ground that many islands were subjected to that process, and though Mr. Heawood deals fully with its other results, this particular aspect of Pacific history does not emerge very clearly.

A special problem intimately associated with the Pacific field was that of the existence and extent of a great southern continent. The present work furnishes by implication an interesting commentary on that problem. For it gripped the imagination of men through ages, and its history has been made the subject of special treatment (mainly in association with Antarctic work) in various recent publications, for which purpose the narrative of certain voyages made with the express object of solving it must needs be considered to the exclusion of all others. But when such voyages as these are taken simply as individual incidents in the general history of exploration there emerges very clearly the extraordinarily weak foundation on which theoretical geographers based their conception of the unknown land, and it is seen how they seized upon certain almost trivial incidents of exploration which appeared to them to support the great idea, neglecting all else in the way of results which if critically examined might have disproved it.

It is not the function of this notice to analyse the contents of the book in detail. But those to whom the period is unfamiliar may value some reminder of its manifold interests, for the reason indicated at the outset. The period practically covers the very beginnings of Arctic exploration, saving the almost prehistoric time of the Norsemen's activities. With the history of the Pacific is associated the first practical exploration of Australia. The seventeenth century in North America opened with Champlain's work; later in the period appear the names of Joliet, La Salle, Mackenzie, and of many other pioneers whose stories, even in a narrative of necessity closely concentrated, do not wholly lose their romance. In South America (whose history in the seventeenth century is here rather unhappily divorced from that of North America by the space of two chapters) the story of geographical expansion is elsewhere too often obscured by considerations of strong sentiment connected with the bitter political history of the continent, but not so in this case. Asia and Africa occupy a subordinate position in the interests of the period; broadly generalizing, it may be said that explorers were then looking towards the new world and beyond it. And, again, it becomes a duty to congratulate the author on his steady preservation of due proportion.

Mr. Heawood incidentally reveals his powers as a draughtsman, for a large proportion of the maps are his own. The outline sketches from the maps of original explorers form a feature of real value in the work, for they are infinitely more serviceable than photographic reductions from the originals—those too

familiar makeshifts which do no more than show blurred outlines obscured by illegible lettering and other defects. Mr. Heawood's simple sketch of the outlines of Central Africa, according to Ptolemy, Waldseemüller, Gastaldi and Mercator, on the other hand, at once enables the reader to recognize the persistence of certain very ancient ideas about African geography, to judge the comparative value of the views of the cartographers named, and to observe the main modifications introduced by them. This is a single illustration (chosen almost at hazard) of an important department of the author's work. The illustrations photographically reproduced from original narratives are less successful, for they neither are particularly well done in a technical sense nor point any obvious morals; it may be a matter of individual sentiment whether or not any special inspiration is to be drawn from the portraits of explorers, the inclusion of which has become something of a convention in histories of exploration. A word of commendation is due to the completeness of the index.

The standard of the Cambridge Geographical Series is firmly upheld by this addition to it. The number of its volumes is small—there are but eight—but each of them points to a high ideal of geographical study in definite specialized departments, and almost every one of them suggests by its subject and scope a possible companion volume or more. Certainly additions to the department of geographical history, if following Mr. Heawood's clear lead in careful research, would be welcome.

O. J. R. H.

THE MONTHLY RECORD.

THE SOCIETY.

King Manoel of Portugal.—At the meeting of the Society on February 24 it was announced that the Council had that day elected King Manoel of Portugal an Honorary Member of the Society.

EUROPE.

The Forms of German Villages and their Distribution.—The *Mitteilungen* of the lately-formed Rostock Geographical Society, of which the second yearly volume appeared in 1912 under the editorship of Dr. Willi Ule, give promise of taking a high place among the publications of the lesser German societies. Among the original articles contained in the second volume, one by Dr. A. Wolkenhauer on the above subject is useful as giving a succinct statement of the present state of knowledge of the question, on which a considerable body of literature has already accumulated. The distribution of village types is much more regular in Northern than in Southern Germany. Although the boundaries are not sharp, Northern Germany may be broadly divided into three meridional belts according to the prevalence of (1) single homesteads (*Einzelhöfe*); (2) clustered villages (*Haufendörfer*); and (3) the *Rundlinge* and street-villages of the old Slav domain. The boundary between the first two types may be drawn roughly along the Weser, the Teutoburger Wald, and the Erzgebirge; that between the second and third along the old Slav frontier running from the Danube by the Böhmer Wald, Bamberg, the Fichtelgebirge, and along the Saale, Elbe, and Ohre, to Lauenburg and Kiel. Opinions have differed as to the origin of the two first types. Thus, while Meitzen regarded the *Einzelhöfe* as Germanic, Möser has held them, apparently without adequate ground, to be

Keltic. On the other hand there is a possibility that they are merely an adaptation to a more or less poor soil, and this seems borne out by the westerly extension of the second type into the domain of the first just where the soil is more fertile. The second type, which is associated with a subdivision of the ploughland into long narrow strips, and widely-scattered holdings, shows no definite arrangement. The *Rundling*, of which the most characteristic examples are found in the Hanoverian Wendland and the Priegnitz district, is marked by a roundish open space in the centre, around which the houses are grouped regularly. It lies off the main roads, and is approached from one direction. The short and broad (originally sector-shaped) holdings correspond to a primitive cultivation by the hoe rather than the plough. Among more special forms of settlement are those of the marshy coasts, placed on artificial elevations, and those of the marsh-lands on the Elbe and Weser, showing the result of Dutch influence. The plough-lands here run in strips at right angles to the main drainage canal. Somewhat similar villages arose too in clearings in the forested regions, the houses being here mostly placed along the course of a stream. As a result of the absorption of small holdings by the great landlords, many fertile parts of Eastern Germany show an almost entire absence of villages proper, the form of settlement being here the *Gutshof*, mostly associated with a park, and accompanied by a few cottages of day-labourers. The process has, however, been to some extent counteracted by Government action in recent times. The later period of settlement, dating from the seventeenth century, is marked by the large number of moor colonies (especially in the north-west) characterized by a network of straight canals which serve both for drainage and transport purposes. The original type of the villages incorporated is still to be recognized in many of the German cities.

Alpine Settlements: Errata.—In the January number, p. 65, line 11, for "really" read "rarely"; p. 66, line 2, for 9140 read 7003.

ASIA.

Dr. Legendre and Captain Noiret in Western China.—The December number of *La Géographie* contains a fairly detailed account of the explorations in 1910–12 of Dr. Legendre and his companions Captain Noiret and Lieut. Dessirier in Western China. The object of the expedition was to carry out a scientific examination of parts of Yun-nan, Kwei-chou, and western Se-chuen, including the basin of the Ya-long. The sudden revolution that broke out in these regions wrecked many of these plans and hopes, and a considerable portion of the maps, records, and collections were destroyed. One important batch of notes which was fortunately recovered dealt with the chief trade-routes of Western China considered with special reference to the new French railway from the Gulf of Tong-king to the capital of Yun-nan. The information collected by Dr. Legendre tended to the conclusion that the French colony has an important future before it in regard to the coming development of the entire region and the way in which the ocean-bound commerce will be attracted towards the French colony. The first part of his work in 1910 lay between Ning-yuan Fu and Ta-li Fu on the one side, and Li-kiang and Yun-nan Sen on the other. The spring of 1911 was passed in exploring the Ya-long, the starting-point of the party being Ta-lo-ho-pa, which lies about the same latitude as Ning-yuan Fu and not far to the west of that town (see note in *Geographical Journal* for March, 1912). From thence the explorations of the three travellers lay in the mountainous and difficult country south of Ta-tsien-lu, watered by the southern course of the Ya-long and its numerous tributaries. Captain Noiret's mission began at Mien-ning in

September of the former year, his instructions being (i.) to carry an itinerary to Cheng-tu by the valley of the Tong-ho, Kia-ting, and Ya-chou; (ii.) to proceed to Chung-king by way of Pao-ning and Kiu-hien; (iii.) to return to Yun-nan Fu by way of the valley of Che-shwei and the Miao country west of Kwei-chou. This task would have occupied from three to four months, but though the first two objects were realized, circumstances compelled Captain Noiret to abandon the third. A few kilometres north of Mien-ning the route lay through a tract inhabited by Lolos and barred to Europeans. Notwithstanding the prohibition of the Chinese authorities, he traversed these regions unmolested, with only two servants. At Shang-pa alarmist news was current. The valleys of the Tong-ho and the Min from Ta-tsien-lu to Sui-fu on the Yang-tse were being ravaged, the ferries were destroyed, and fighting was going on round Cheng-tu, Ya-chou, and Kia-ting, while the European missionaries had had to fly and abandon their ruined residences. All the communications were cut, but Captain Noiret eventually arrived at Kia-ting in thirty-five days by a route which is ordinarily covered in ten stages. From Kia-ting he wished to proceed north-west to Ya-chou, but this proved impracticable, although he found that in these parts the rebels had strict orders not to molest Europeans on any account. In these circumstances the captain arranged to make northwards for Cheng-tu Fu, where, though the surrounding regions were in a state of complete anarchy, the capital itself and its environs were still held by the Viceroy Chao-Eul Fong, who had formally requested all the Europeans left within the walls to remain. Captain Noiret, however, managed to escape without the knowledge of the Chinese authorities, and a few days later the rebels seized the city. In the following month all the Europeans departed, and soon afterwards the viceroy was arrested and decapitated. The country north-east of Cheng-tu Fu proved to be in a terribly disturbed condition, and between Nan-pu and Kiu-hien, at a village called She-ho-chang, the captain and his servants were assaulted and stoned. Notwithstanding this, M. Noiret carried out his instruction to secure photographs of the particular monuments which he wished to visit, and later on he reached Chung-king, where he received news, fortunately exaggerated, of the attack at Hwang-shwei-tang on Dr. Legendre and M. Dessirier. Although at first he was informed that his two friends had been killed, he subsequently found that they had escaped safe and sound and had descended the Yang-tse, and thence repaired to Hanoi, where Captain Noiret eventually joined them.

Tectonic Relations of Timor.—The question whether Timor forms part of the volcanic belt running through Java and the closely aligned islands to the east of it has hitherto met with no satisfactory answer, the old belief in the volcanic character of the island having continued to find some adherents, though its correctness has been doubted by others. During a recent visit for the study of occurrences of oil and gas, Prof. George I. Adams paid particular attention to the question, with the result that he has come to the conclusion that Timor must be definitely struck off the list of volcanic islands (*Philippine Journal of Science*, vol. 7, Sect. A, No. 4, 1912). The current misconception seems to have been due principally to a statement in Scrope's well-known work on volcanoes to the effect that in 1638 a colossal cone in Timor was entirely destroyed by a volcanic catastrophe. This has been repeated by others, who have also referred to supposed eruptions of later date. The only basis for the idea seems to be the existence of a so-called "mud-volcano," which Prof. Adams visited. In his view its activity, with other supposed manifestations of volcanic force, has been a result of earthquake shocks. The original source of

Scrope's statement appears to be Iltig's 'De Montium Incendiis' (Leipzig, 1671), the Jesuit annals being there given as the authority; and it may be suggested that there was here a confusion between Timor and some other island of the archipelago. Prof. Adams makes no reference to Kotô's memoir on the geologic structure of the Malay Archipelago (*Journ. Tokyo Coll. Sci.*, vol. 11, part 2), in which the same conclusion as to the non-volcanic character of Timor is arrived at.

A Natural Bridge in the Philippines.—The same number of the *Philippine Journal of Science* contains a brief description of a remarkable natural bridge, lately discovered by Mr. Paul R. Fanning in the Cavite province, south of Manila. It lies on the Luksuhim stream a little west of Silang. The bridge spans the cañon of the stream, and the opening beneath it is tunnel-like, with a diameter of some 35 feet and a length of some 250 feet. Its floor, now about 130 feet above the stream, gives evidence of having once formed the bed of the latter, which must have flowed for some distance at this higher elevation and then passed over a cliff. Seepage must have begun at a point higher up, an underground channel being formed, and rapidly enlarged until the whole stream followed this course. Subsequent erosion and caving have produced the short cañon above the present entrance portal.

AFRICA.

The Saharan Railway Expedition.—A connected account of the French expedition of 1912 under Captain Nieger appears in the January (1913) number of the *Afrique Française*. It will be remembered that the expedition was the outcome of the renewed attention directed by M. A. Berthelot to the old question of a railway across the Sahara, and that its task was the examination of various lines of country to test their suitability for the purpose. A second expedition under M. Maitre-Devallon was organized about the same time for the lesser task of studying the best route in the northern area between Algiers and the Saharan oases. It occupied only four months, but led to the choice of a route which, branching off from the Algiers-Oran line, makes for the upper course of the Wed Gir and finally reaches Adrar, the chief centre of Tuat. This last, therefore, formed the starting-point of the studies of Captain Nieger and his coadjutors. In view of possible objections that a route through Tuat is by no means the most direct from Algiers to Lake Chad, Captain Nieger discusses the various other lines that have been suggested, showing that in each case the conditions of the country—moving dunes, absence of water, and the like—would offer insurmountable obstacles. From Adrar the route followed by the main party took a south-east course to the corner of the Ahaggar plateau, passing between the Muidir and Ahnet plateaus on the way. It afterwards continued in the same direction across the Tanezruft, and skirting the western border of the Air highlands reached Agadez and finally struck the north end of Lake Chad. Detachments under Captain Cortier and M. Chudeau meanwhile carried out reconnaissances to the west of this line, with a view to studying the best route for a branch line to the Niger valley. These subsidiary routes led to Wallen, on the west side of the Ahnet plateau, and thence south to a point not far from Gao on the Niger; skirted both sides of the Southern Adrar in a generally north-east and south-west direction; and connected Ansongo on the Niger with In Gezzam, west of Air. Besides this, by further subdivision of forces, the various parties extended their surveys to the country for some distance on either side, thus securing quite a network of itineraries. They were able to bring back at least 10,000 kilometres of route-surveys by compass, controlled by 150 positions fixed astronomically or geodetically according to circumstances.

Levelling was effected by the most precise barometric methods, and detailed surveys of specially important features were carried out by tacheometer. From the point of view of the railway, it was important that any line adopted should entail the smallest amount of embankment or other constructive works, and should avoid the moving sands which are a serious obstacle in many parts. Captain Nieger declares that from these points of view the results are most satisfactory, the proposed lines encountering no serious obstacle throughout, the only requisite for much of the way being the levelling of a platform. The only important line of dunes to be crossed is in the Sudanese zone, and these are fixed by arborescent vegetation. Water-supply is a problem to be faced, but this seems not insoluble. In one section, viz. between the Muidir and Ahnet plateaus, the geological studies point to the possibility that an artesian supply may be obtainable.

The Audoin Hydrographical Mission in French Equatorial Africa.—This mission, the early part of whose labours was referred to in the *Journal*, vol. **38**, p. 532, lately returned to France after completing its task, and a general summary of the work accomplished is given in the *Quinzaine Coloniale* for January 25, 1913. The first question to be studied was that of a port in the southern part of the territory, to serve as a terminus for the proposed Brazzaville railway; and, as already mentioned, the choice fell on Pointe Noire, which possesses advantages over Loango bay in the nearer approach of deep water to the shore, and the absence of an intervening lagoon. The immediate needs can here be met by the construction of a jetty 200 yards long, with the necessary lighthouses, wharfs, etc.; and these measures will place the port at least on a level with those of Grand Bassam and Kotonu. A more ambitious proposal for the future is that of the building of a breakwater a mile and a half long, with quays giving a depth of 36 feet at low water. This would cost a sum approaching £2,000,000, but in view of the vast interior tracts to be served by the port, it is thought worth the outlay. The rest of the work was concerned with the basin of the Ogowe and neighbouring districts. The navigable lower stretches of the river were carefully surveyed, with the lakes connected with it, as well as the lagoons which offer facilities for sheltered navigation in a direction parallel to the coast. Suggestions were made for the improvement of the port of Manji (Cape Lopez), and measures have already been taken to carry them into execution. They consist in the erection of a jetty, lighthouses, etc. The question of the best site for a river port on the Ogowe was also studied, as also that of the most favourable situation for the creation of a future commercial port on the Gabun estuary. The choice fell on Owendo point, which possesses many advantages over Libreville, though the latter will still serve for the immediate future. The surveys have also supplied the basis for much-needed sailing directions for this part of the African coast, for which the surveys of Captain Owen in 1824 still form the main source of information. Differences of longitude of the principal points were determined by telegraphic signals. In addition to the more practical studies, valuable investigations in geography and climatology were also carried out.

AMERICA.

Eruption of Katmai Volcano, Alaska, 1912.—This eruption took place on June 6, 1912, and caused considerable alarm in the stations on Kadiak island, from which the Katmai volcano is distant only about 70 miles. An account of the occurrences, pieced together from the various sources of information, is given in the *Bulletin* of the Seismological Society of America (vol. **2**, No. 4), by

Mr. George A. Clark, who was in the Pacific ocean some 500 miles south-west of the scene of the explosion when it occurred. The Revenue cutter *Manning*, which was at St. Paul's village on Kadiak on June 6, was equipped with wireless apparatus, and after some delay managed to get into communication with the outside world, with the result that relief was at once sent to the sufferers from the catastrophe by other vessels of the Bering sea patrol fleet. It is from the reports of the officers of the *Manning* that the details now published were collected. On the afternoon of the 6th a remarkable cloud began to appear in the south and west, and this was soon followed by one to the north. The two coalesced to the accompaniment of thunder and lightning, and the blackness of night settled down two hours before sunset. Volcanic matter (ashes, dust, and sand) fell at intervals, and intense darkness set in again at 2 p.m. on the 7th, continuing through the 8th. On this day the ashes consisted of fine dust with flakes of yellowish colour, while sulphurous fumes filled the air. The natives sought safety on the vessel, but the utter darkness made it impossible to leave the harbour until the afternoon of the 8th, when the fall of ashes diminished, and the sky took on a reddish hue, though not till the morning of the 13th was the air again pure and free from visible volcanic matter. On the 14th the ground at the base of the volcano was explored, the boat encountering floating pumice and ash to a depth of from 4 to 10 inches. The town of Katmai was found buried to a depth of 3 or 4 feet, but fortunately the villagers were absent at their summer camps. The deposit lay in four layers: fine light grey, light orange, coarse black, and plain grey. Even then rumblings and tremblings of the Earth were experienced, punctuated with loud reports, and the mountain-top was obscured by a black cloud streaked with lightning.

Progress of the Millionth Map of the United States.—The *Bulletin* of the American Geographical Society for November, 1912, contains a summary by Mr. W. L. G. Joerg of the steps so far taken in execution of the United States portion of the International Map of the World on the millionth scale. Some ten years ago a beginning had been made by the Geological Survey in the preparation of manuscript contour maps of certain States on the scale of 12 miles to the inch, and the compilation of further sheets on this scale was authorized after the meeting of the Eighth International Congress in 1904, with a view to their being eventually reduced to the millionth scale. Such maps were prepared for about 28 per cent. of the area of the States, but it was then decided to begin afresh, the work being entrusted to the Topographic Branch of the Survey, under the direction of Mr. R. B. Marshall. Work was begun in 1908, and copies of the sheets under preparation were exhibited at the meeting of the International Map Committee in London in 1909. The final edition of the first sheet was issued last October. The map is compiled on the scale of 1 : 500,000 as a base map, relief being omitted in the first instance, and added later upon a lithograph of the original drawing. The unit is the international sheet, but in some cases portions of base sheets have been assembled so as to supply base maps of individual States. An index-map accompanying the paper shows that the base maps have been completed, exclusive of relief, for about the eastern third of the States, as well as for a limited area further west. The sources of the map are very various, and this has added to the difficulty of compilation, *e.g.* for five-eighths of the United States no topographic sheets exist, and recourse must be had to miscellaneous maps in publications of the Survey, maps of the General Land Office, and so on. A general large-scale map of the United States has been a long-felt want, and the sheet already published, which covers east central New England, shows how admirably the want will

be supplied. A representation of this important part of the United States, of real geographical value, is now for the first time available.

Water-Power on the Mississippi.—One of the biggest schemes ever evolved for the utilization of water-power is approaching completion at Keokuk, Iowa, where the Desmoines rapids offer exceptional facilities for the purpose—the only ones, in fact, existing on a large scale in the whole middle and lower course of the Mississippi. Some account of the works under construction, and of the way in which they are to be utilized, has appeared in the *Bulletin* of the Pan American Union for November, 1912, and also in the *Journal of Geography* for January, 1913. The possibilities offered by the site were long a subject of discussion, and some actual attempts were made to utilize them, but without real success until the task was taken in hand in 1905 by the Mississippi Power Company, which obtained the authorization of Congress. The whole work has been in charge of the chief engineer, Mr. Hugh L. Cooper, whose genius has triumphed over difficulties of all kinds. The great dam is nine-tenths of a mile long, built like a bridge with 119 arched spans, each forming a spill-way to permit the passage of water through its upper part. They will be fitted with sliding steel gates to regulate the flow. The dam is built of solid concrete, its foundations sunk 5 feet into the solid rock here forming the bed of the river. From one end stretches the power house, nearly a third of a mile long, between which and the Iowa shore is an immense pool to be maintained at a constant level, supplying water through thirty arched portals to the turbine water-wheels. Each has four intakes, which convey the water to the turbine chamber, 39 feet in diameter, and so shaped that the water strikes every point on the circumference of the turbine with equal force. With the normal water-head of 32 feet each turbine will develop 10,000 horse-power of electricity. There will be a vast lock, of equal size and with greater lift than any at Panama, which will take the place of the three small locks hitherto in use, and permit the much more rapid passage of vessels. The dam will hold up the water for some 65 miles above its site, and through the slack water thus formed a navigable channel of not less than 8 feet is to be maintained. A great development of manufacturing industry is expected to result from the undertaking in this part of the Mississippi valley, which, it is pointed out, has a particularly favourable situation in respect of lines of transport, and especially of access to the Panama canal.

Earthquake Sounds in Haiti.—The *Bulletin* of the Seismological Society of America (vol. 2, No. 4) quotes local accounts of remarkable earthquake sounds heard in various parts of Haiti, and there known as the *Gouffre*. The sounds are sometimes ascribed to hurricanes, but are more generally thought to be of seismic origin. They are, apparently, general in the western part of the island, and are variously likened to the booming of cannon, the rolling of thunder, the sound of a heavy train, or wind blowing through trees. The sounds are most commonly heard in the range of La Selle, composed of Tertiary limestone. This region is very unstable, and the mountains give much evidence of past volcanic activity. The detonations are often pretty definitely localized by the hearers as coming from particular parts of the mountain face. They were specially frequent and distinct in November, 1911, both by day and by night, though differing in the one case from the other. Those heard at night are described as resembling a perfect tumult; rumbling of thunder, howling, or the rushing of a strong wind; or, again, as like the shattering of a mountain of glass, echoed in all directions; sometimes as the roar of surf or the thud of objects falling. These phenomena would seem to have much in common with

the sounds known elsewhere as "Barisal guns," "Mistpoeffers," etc., the cause of which has given rise to so much speculation in various parts of the world.

Eruption of Colima Volcano, Mexico.—Through the courtesy of the Foreign Office we have received a cutting from the *Mexican Herald* of January 22, 1913, giving details of an eruption of the Colima volcano which had just taken place. The most violent manifestations seem to have occurred on the 20th, when sand and ashes were ejected in large quantities, but the volcano continued active at intervals on the 21st. A new crater is said to have opened near Platanal, and forest fires were caused by the overflow of lava. Ashes and sand fell, and at Guzman complete darkness prevailed. Trains were delayed by the heating of the axle-boxes due to the penetration of the volcanic ashes, and it was feared that growing crops had been destroyed in the Zapotlan district.

The Yale Peruvian Expedition of 1912.—This expedition (*Journal*, vol. 39, p. 615) returned to the United States in December last, having completed a considerable amount of research work in spite of various drawbacks. Some account of the general results is given in *Science* for January 17, 1913. Members of the party had been subject to a good deal of illness, and one of them, Mr. Heald, met with a serious accident. It was found that in the Peruvian Montaña, on the east slopes of the Andes, the so-called "dry season" is only a relative term, being much wetter than the "wet season" often is elsewhere. Epidemics of small-pox and typhus prevailed in certain valleys, and interfered with the anthropological work, though a considerable number of measurements and photographs were secured by Dr. Nelson. Prof. Gregory spent most of his time studying the complex geological problems in the vicinity of Cuzco and the Hatanay valley. Valuable osteological and ethnological collections were secured by Dr. Eaton from the ruins of Choquequirau and Machu Pichu, including fifty skeletons, probably of Incas. Meteorological work was carried out, and stations were established at different altitudes, where continuous observations will be maintained for five years. The ruins of Machu Pichu (discovered by Prof. Bingham in 1911) were carefully excavated and surveyed, and a large number of photographs taken, with the help of which it is hoped to construct a model of the city. Prof. Bingham also explored other hitherto undescribed ancient ruins, and carried out other archæological investigations.

AUSTRALASIA AND PACIFIC ISLANDS.

The Kaiserin Augusta River Expedition, German New Guinea.—Further reports from the German expedition to this river under Herr Stollé (*Journal*, February, 1913, p. 170) continue to be received, and are printed in recent numbers both of the *Kolonialzeitung* and *Kolonialblatt*. The leader reports that at each new step new problems in geography and especially ethnology present themselves, but thinks that at the end of a year's work the region of the lower and middle course of the river will have been more or less completely investigated from these points of view, as well as from those of botany and zoology. Geographically, the most important results have been obtained from an expedition carried out by Dr. Behrmann south from the April river, on which he reached the main divide in about 5° S., 142° 40′ E. In a preliminary report printed in the *Kolonialzeitung* for February 22 he sketches the main morphological features of the country traversed, which is nearly everywhere clothed in dense forest and very thinly peopled. The main divide which, where visited, ran through German territory, had a height of from 1700 to 2400 metres (5600 to 7800 feet). North of this there is a partly independent range or ranges, which seem, however, to connect with the central range in the west.

Geologically, the more recent sedimentary formations of the north give place in a southerly direction to slates, shales, etc., traversed by quartz-veins, which generally form the most prominent summits. The whole shows strongly the influence of erosive forces, all the forms being those due to fluviatile erosion. All the camps were fixed astronomically, and surveys were carried out by trigonometrical and photogrammetrical work as well as by the plane-table. Complete series of meteorological observations have been secured from the main stations occupied by the expedition. At the headquarters at Malu a rainfall of 93·9 mm. (3·7 inches) was registered in a single night.

Dr. Wollaston's Ascent of Mount Carstensz.—News has been received in Holland from an official source that Mount Carstensz, the highest known summit of the snowy range of Western New Guinea, has been successfully ascended by Dr. A. F. R. Wollaston, accompanied by Lieut. van de Water, of the Dutch army. This, it will be remembered, was the chief task which Dr. Wollaston (who had taken a leading part in the previous expedition to Dutch New Guinea, organized by the British Ornithologists' Union) had set himself when undertaking his new expedition (*Journal*, vol. 39, p. 288), and he is to be congratulated on successfully accomplishing his object. The height of the peak has been variously estimated, being thought for a time to reach an altitude approaching 18,000 feet. Recent surveys, however, especially those of the previous British expedition, had given reason for reducing the height to something under 16,000 feet.

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

The Atlantis Problem.—A disposition has been manifest of late to treat this problem from a more scientific standpoint than has hitherto been the case, and to carefully examine the actual evidence from geology, zoology, botany, etc., pointing to the geologically recent existence of land in the North-Central Atlantic. Such a study, summarizing the facts in a striking and convenient form, is contributed by Prof. Termier as No. 256 of the *Bulletin de l'Institut Océanographique* of Monaco (January, 1913). The writer begins by recapitulating the story as told by Plato, and arrives at the conclusion (in which he will hardly perhaps carry all his readers with him) that the precise and circumstantial character of the narrative points to its being based on actual fact. However this may be, the physical evidence adduced later may be regarded by some as having a cumulative force, indicating that lands have disappeared beneath the Atlantic within relatively recent times. Attention is called first to the marked irregularity of the floor of the ocean in its raised median zone; to the volcanic zone which runs without a break from north to south through the more eastern part, and to its marked instability, rendering it even now liable to violent cataclysms. Stress is laid on the evidence obtained during operations for the repair of the telegraph cable in 1898, which showed that the submarine elevations were composed of a vitreous lava, which could only have consolidated under the pressure of the atmosphere, while the jagged character of the rock points to sudden submergence before the effects of erosion or abrasion could be manifested. The earlier geological history is outlined from the times when the main tectonic lines ran east and west, a continuation of the great Mediterranean depression extending between a North Atlantic and a South Atlantic continent bounded by folded ranges of the so-called Hercynian system. The Tertiary history, when the folds of the Alpine system were quite probably prolonged westward to the Azores and Canaries, and even beyond, supplies further evidence of the great changes to which this region of the Atlantic has been subject, and its pronounced mobility at the point of intersection of the Mediterranean depression

with the volcanic zone. The zoological evidence put forward by M. Louis Germain is all in the same direction. The fauna of the four Atlantic groups is distinctly continental in type, and shows close affinities with fossil species from the European Tertiary; while identical species of molluscs are found in the Quarternary formations of the Canaries and of Mauritania. The *Oleacinidæ*, again, are found at the present day only in Central America, the Antilles, the Mediterranean, and the three more northern archipelagoes, while other molluscs are common to the Antilles and Senegal. From these facts the conclusion may possibly be drawn that in Miocene times an Atlantic continent extended to the Antilles; but one may still hesitate to accept Plato's narrative as an actual record of the final catastrophe.

HISTORICAL GEOGRAPHY.

Vespucci and the Naming of America.—Continuing his study of the part played by Vespucci in the geographical history of his time (*Journal*, vol. 40, p. 221), M. Vignaud has contributed to the *Journal de la Société des Américanistes de Paris* (N.S. vol. 9, 1912) a clear summary of the facts bearing on the attribution of Vespucci's name to the American continent, forming at the same time to some extent an analysis of the geographical labours of Martin Waldseemüller. He hardly, perhaps, put forward any new considerations, but as he is naturally led to discuss various disputed matters, it is of some interest to note the nature of his conclusions on these. To begin with, he naturally has no difficulty in showing that Amerigo was really the first name of Vespucci, and that consequently the endeavours to prove an indigenous origin for the name America must fail. Regarding the statement in the *Cosmographiæ Introductio* of Waldseemüller that this book was to be accompanied by a representation of the world, both *in solido* and *in plano*, M. Vignaud holds the view that the former is represented by the inset in the large map of 1507, and not by the Hauslab gores. There is certainly something to be said for this view, in spite of the somewhat strained use of the term *in solido* in this case. No great weight can, however, be attached to the argument derived from the continuity of the American coast-line in the inset, and the representation of a strait on the gores (showing that the former more nearly represented Vespucci's ideas on the subject), inasmuch as no positive indication of a strait is given, but the coast-lines are merely broken off where actual knowledge ceases. As regards the later maps of Waldseemüller, in which the name America is omitted, M. Vignaud accepts the view that this indicates a definite abandonment of his former proposal for the naming of the New World, which had only been made under the impression that South America was a quite independent mass of land; also that he had entirely rejected Vespucci's cosmographical notions, and gone back to those of Columbus in respect of the relationships of the newly discovered lands. This last may be open to question, in view of the generally slipshod methods of this cartographer, who was quite capable of adopting bodily the statement that the land named Cuba was part of Asia, without thereby definitely giving up his former notion of an intervening Pacific ocean. If, indeed, the "Margharita" map of 1515 has been correctly attributed to him, he still at that date held to the belief in such an ocean. That the name "America" held its own is to be ascribed to the great vogue of the 1507 map, though it is to Mercator that we must ascribe the extension of the designation to the northern part of the continent. As regards Waldseemüller's general competence as a cartographer, M. Vignaud is under no illusions. He possibly

even over-duly disparages his later work, at least with respect to Africa, the African outlines in the maps of the 1513 Ptolemy (which he with justice regards as Waldseemüller's) being distinctly creditable for their time.

GENERAL.

Livingstone Memorials.—As a contribution to the recent Livingstone centenary celebrations a small brochure has been issued by Livingstone College (itself a notable memorial to the great traveller) containing reproductions of pictures and other items of interest in connection with the event. The pictures include two striking portraits in colours, taken from pictures in the possession of the College (the one an oil painting by Malcolm Stewart, the other a crayon drawing from a photograph); the section of Livingstone's tree, with the inscription cut by his native followers; the inscription on the tomb in Westminster Abbey; and a photograph of Livingstone College. The poem which appeared in *Punch* on April 25, 1874, is also given, as well as a few apt quotations from Livingstone's writings. The brochure is sold at 6*d.*, and the coloured portraits on postcards at 1*d.* each. Many will no doubt avail themselves of this opportunity of acquiring such interesting mementoes. In connection with the celebration, the College has issued an appeal for much-needed funds for the proper carrying out and extension of its work. A total sum of £10,000 is required, and subscriptions may be sent to Dr. C. F. Harford, the Principal (Livingstone College, Leyton, E.).

Summer Course in Geography at Aberystwyth.—The University College of Wales, Aberystwyth, announces a summer school in geography for the period July 28–August 16 of this year. Its object will be to assist on the one hand teachers in regard to modern methods of geography teaching, with especial reference to its humanist side, and on the other those desirous of making detailed regional studies. Lectures will be delivered by Profs. Fleure, Lewis, and others, and practical and field work and excursions will also be arranged for. The fee for the course is £2.

OBITUARY.

Dr. E. A. Wilson.

The best sketch of the life and character of Dr. E. A. Wilson, Chief of the Scientific Staff of Captain Scott's Second Antarctic Expedition, and one of the heroic four who shared their leader's tragic fate, is that which appeared in the *British Medical Journal* for February 22. Edward Adrian Wilson, B.A., M.B. Cantab., was the son of Dr. E. T. Wilson, Consulting Physician to the Cheltenham General Hospital, and was born in 1872. After passing through Cheltenham College, he went up to Caius College, Cambridge, as an Exhibitioner in 1891, and in 1894 took a first class in Part I. of the Natural Science Tripos. Rowing was his favourite recreation, and during his three undergraduate years he represented his college, both in the Lent and May races. At Caius he was a contemporary of Prof. J. Stanley Gardiner, who, in reminiscences contributed to the notice above referred to, bears warm testimony to the universal regard in which he was held by all who knew him at Cambridge, as well as to his many sterling qualities displayed both then and in his subsequent life. His bent lay chiefly towards the career of a field naturalist, but the need of taking up some definite calling led him to turn to medicine, and he went through the usual course at St. George's Hospital, where he made many friends. He also worked at the Caius College Mission at Battersea, and

during this time, while working keenly at the pathology of tuberculosis, he himself developed pronounced symptoms of the disease, which forced him to go abroad and give up the medical career. He completely recovered, however, and, as is known to all readers of the *Journal*, was accepted by Captain Scott, when organizing his first expedition, as member of the scientific staff. During the expedition he was described by his chief as the life and soul of the party—the organizer of all amusements, always good tempered and cheerful, the ingenious person who could get round all difficulties, and as knowing no fear. The results due to him in his own special subject—the zoology, especially the birds and mammals, of the Antarctic—are too well known to need dwelling on, as is also his artistic talent, which enriched the published results of the expedition with a striking series of sketches of bird-life and of nature in the Antarctic.

The working up of his observations occupied him some time after the return of the expedition, and his next important piece of work was in connection with the recent committee on grouse disease, to which he acted as zoologist. To the value of his services ungrudging testimony has been borne by the chairman of the committee, Lord Lovat, who described him as not only an indefatigable worker in the field, but as having been of the utmost help in the inquiry by his ornithological knowledge, his scientific training, and his artistic skill, which last was freely placed at the disposal of his colleagues in the preparation of the report. Of the fourteen chapters of which it consisted, Wilson either wrote, or aided in writing, the first ten, and he also contributed valuable papers to the appendices.

It is unnecessary to dilate on his services to Captain Scott's Second Antarctic Expedition, to which he was appointed Chief of the Scientific Staff at an early stage of its organization. To its work, both general and scientific, he contributed with his wonted industry and keenness, and his mid-winter expedition to the penguin rookery at Cape Crozier was a feat of endurance hardly to be matched in Polar travel. From the first he was marked out as one of the leader's companions on the final march to the Pole, and, as sole representative in this small party of the strictly scientific side of the expedition, his work would be particularly responsible and onerous, entitling him to a large share in the credit for the scientific results brought back. The judgment with which the geological collections were made, by one not a professed geologist, has been particularly dwelt upon by the survivors of the expedition.

Of a modest and retiring disposition, Wilson was perhaps really known to but a few intimate friends. All who did so know him are unanimous in their testimony on the one hand to his deeply religious character, his strong sense of duty, his ascetic purity; and on the other, to his kindliness, his keen sense of humour, his enthusiasm and joyousness, qualities of the utmost value in an undertaking like a Polar expedition. He married immediately before his first Antarctic voyage, and for more than a year before the news of his death arrived, his wife had been awaiting him in New Zealand. He leaves no children.

Captain L. E. G. Oates.

Captain Oates, whose heroic end in the Antarctic has moved the admiration of the whole civilized world, was the elder son of the late Mr. W. E. Oates, of Gestingthorpe Hall, Essex, and was born in 1880. Educated at Eton, and leaving school at the outbreak of the Boer war, he joined the Inniskilling Dragoons, and took an active part in the campaign in South Africa. He soon became known for his daring and courage, and for his absolute fearlessness. On one occasion, having been sent to engage a Boer commando, he and his small company found themselves surrounded by a much stronger force, and were summoned to surrender. To this he replied

that he had been sent there not to surrender, but to fight. In the engagement which ensued he and several of his men were severely wounded, but he succeeded in getting all the unwounded men away in safety. After recovering from his wounds he took part in much hard fighting with Rimington's column, in the latter stages of the war, but was at last invalided home with enteric. Becoming adjutant of his regiment, he saw further service in Egypt and India. He is described as possessing all the qualities of a dashing and successful cavalry officer, and was remarkable for his personal popularity, ability, and power of ruling men. He was an enthusiastic yachtsman, with a passion for the sea, which frequently led him into danger, as he would venture out in weather which deterred even practised seamen. On applying to join Captain Scott's expedition—to which he contributed a considerable sum from his private means—he was accepted, and was placed in chief charge of the ponies and dogs. He was one of the most popular men of the expedition, and would often revive the spirits of the men by yarns when circumstances were adverse. The news of his death, which occurred on his thirty-second birthday, was received with universal regret at his village home in Essex, where he had long been a general favourite.

Lieut. Henry R. Bowers.

Henry Robertson Bowers was born in 1883. His father, a master mariner, died in the boy's childhood, leaving him to the care of his mother, who faithfully fulfilled her duty in this regard. He was at the High School, Streatham, but an instinctive hereditary calling to a sea life soon developed, and at fourteen—in 1897—he became a cadet in the training ship *Worcester*. Here from the first he did well in school, seamanship, and sports. His quiet, earnest, persistent character brought him to the top. He left in 1899 with the Highest Class certificate, an "Excellent" conduct record, and third in order of merit on the Queen's Medal list of that year. He won the esteem and liking of all his superiors and his shipmates. He was active in games and a good oarsman.

Some years after leaving the *Worcester* he competed and won in an "Old Boys" race on the Annual Sports Day. His hobby and special pursuit was Natural History, and he made himself an expert photographer in order to study Nature the better.

Bowers went to sea in 1899 in the sailing ship *Loch Torridon*, where he rose to be Chief Officer. He was appointed to the Royal Naval Reserve, and, in 1905, to the Royal Indian Marine. When Captain Scott was fitting out his Antarctic expedition, Bowers applied for a post on the staff and was accepted. He took the keenest pride and pleasure in the appointment, and threw himself whole heartedly into his work. Scott realized that in him he had a valuable assistant, and wrote of him soon, "Bowers is doing excellently." Writing to the captain of the *Worcester* from the Antarctic, Bowers reported that they were all very happy and all very keen on helping to make the expedition and its work thoroughly successful. Of the *Worcester* he wrote: " . . . and best wishes to the dear old ship, whose name we will try to do honour to in the far South."

Nobly has he done his part with the others. They have left us an undying memory of gallant lives well and bravely ended, of duty quietly fulfilled, and of achievement won through strenuous endeavour, heroic endurance, and at the cost of life itself.

We who knew and greatly valued those brave fellows realize fully the extent of our loss, and the greater grief and loss that have befallen their families. In the midst of her grief, Lieut. Bowers' mother wrote, "I am glad they did not forsake their sick companions, though it meant death to themselves." To her and to his sisters his old *Worcester* friends offer their sincere and respectful sympathy.

D. Wilson-Barker.

Benjamin Leigh Smith.

The well-known Arctic voyager, Mr. Benjamin Leigh Smith, who died in January, was born on March 12, 1828, being the son of Benjamin Smith, M.P. for Norwich. He was educated at Bruce Castle and Jesus College, Cambridge, and was called to the Bar at the Inner Temple in 1856. He took an active part in the Inns of Court Volunteers, was a good shot and fired in the Queen's Hundred. In 1887 he married Miss Charlotte Sellers and leaves two sons, Valentine, born 1888, and Philip, born 1892. He had joined our Society in 1875 and was the recipient of the Patron's Medal in 1881 in recognition of his Arctic work. He was also a Fellow of the Zoological Society, a member of Reform Club and of the Oxford and Cambridge Club.

Leigh Smith was always interested in Arctic work, and from his earliest days was a great friend of Sir Allen Young. During the sixties he chartered the *Samson*, a schooner of 80 tons, and made two successful voyages to Spitsbergen, sailing round the north coast of the group and surveying its north-east part. During the cruise he found that the Gulf Stream flowed round the north of Spitsbergen, and it was always a sore point with him that his researches in this connection were not properly recognized until they were verified some years later by Nordenskiöld.

In 1873 he chartered a steamer, the *Diana*, and again went to Spitsbergen, but was unable to do much, being imprisoned by ice for many weeks in Wijde bay. It was during this cruise that he was able to relieve a party of Swedes who had been obliged to winter in Wijde bay, giving them provisions and enabling them to return home safely. In 1880 he built the S.Y. *Eira* (a steamer of 340 tons and 50 h.p.), and on June 21 of that year the *Eira* sailed from Peterhead with a crew of twenty-five all told. After visiting Spitsbergen and finding it impossible to get round by the north of the group, he turned and examined the ice-edge in the Barents sea, and after several failures at last reached Franz Josef Land, surveying the coast from Cape Barents to Cape Lofley. On August 18 he discovered a good harbour which was named Eira harbour, and soon afterwards returned to Norway.

In 1881, Leigh Smith started on his second voyage from Peterhead in the *Eira*, reaching Franz Josef Land on July 23, but he was unable to do more than he had done in 1880, being stopped by heavy ice off Cape Neale. In returning the ship was crushed on August 21 and sank about 2 miles from Cape Flora, leaving twenty-five men with four boats and tinned provisions for six weeks, and with only the clothes they stood in, to carry them through the winter. Fortunately three rifles were saved and about two hundred rounds of ammunition. The boats and what was saved were dragged to Cape Flora, where a hut was built in which ten months were passed. During this trying time Leigh Smith proved what a splendid leader he was. Many a time food was short, but he never allowed any waste, always looking well ahead and insisting on having a month's provisions in hand, so that if no bears were shot all hands had to reduce the daily rations of food. Fortunately, in January, 1882, five walrus were killed close to the hut, or the whole of the crew must have starved. In the spring of 1882 preparations were made for the boat journey home. Sails were made out of a dozen tablecloths which by chance had been saved from the ship. On June 12 the ice broke away from the land, and six walrus were killed during the next week. These were cooked and put into tins for the boat journey, so that on June 21 the boats were launched and the journey to Novaya Zemlya began. On August 3 all four boats reached Novaya Zemlya, and on sailing into Matochkin strait the *Hope* was sighted. She had been sent from England under the command of Sir Allen Young to look for Leigh Smith, and it was with great rejoicing that Sir Allen welcomed his old friend and brought him home to England without the loss of a man.

Always a very reserved man, Leigh Smith never talked much about himself,

nor did he take part in any discussions at the Society. He was a born explorer and leader, and had he lived thirty years later would doubtless have done great things. For some years he had been an invalid, but never lost interest in Arctic work. The end came in January, 1913, from a sudden attack of gangrene in the leg.

W. H. NEALE.*

Major-General Henry Clark, R.A., F.R.S.

Major-General Clark, who died on February 28, 1913, at the advanced age of 91, was in his younger days brought into touch both with Arctic and Antarctic exploring work, and therefore deserves a brief notice in the *Journal*, though he had never become a member of the Society. He was stationed at the Cape, in the Artillery, when the *Pagoda* was sent south in 1845, in command of Lieut. T. G. L. Moore, R.N., to supplement Sir James Ross's magnetic work, and he joined the expedition as magnetic observer. The voyage of the *Pagoda*—the last sailing ship to carry an expedition for Antarctic research—encountered considerable difficulties, but a latitude of 67° 50′ was reached in longitude 39° 41′ E. and a considerable expanse of the southern ocean was navigated. Clark's meteorological and magnetic observations during the cruise were published in the 'Philosophical Transactions' of the Royal Society.

After the return of the *Pagoda*, Clark was for a time in charge of the gun-carriage department at Woolwich, and was thus brought in contact with the Arctic expedition which fitted out there in 1850. He took a keen interest in the expedition, and helped with the outfit in various ways, especially in connection with the magnetic instruments to be taken.

The deceased general was son of Sir George Clark of Penecuick, long a Fellow of this Society and a frequent attendant of meetings in the days when Sir Roderick Murchison directed its activities. Major-General Clark was a second cousin of Sir Clements Markham, to whom we are indebted for the above notes, Sir George Clark having married the first cousin of Sir Clements' father. For some time the deceased had been "Father" of the Royal Society.

J. H. W. Sheane.

We regret to record the death, which took place in North-Eastern Rhodesia, as the result of fever, on February 26, of Mr. James Hubert West Sheane, an officer in the Chartered Company's service, of whose station at Fort Rosebery he was in charge at the time of his death. He was known to the public as joint author (with Mr. C. Gouldsbury) of 'The Great Plateau of Northern Rhodesia' (1911), a useful account of the uplands south of Tanganyika, and especially of their inhabitants —the Awemba. He took a B.A. degree with honours at Cambridge, and also took honours in his examinations for the bar, the last of which he passed successfully in 1911. He had been in the Chartered Company's service about twelve years, and the value of his work in Rhodesia had been much appreciated. He married Irene, daughter of J. Gurdon Stephenson, Esq., who went out with him to Rhodesia, and who survives him. He joined the Society in 1905.

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* Dr. Neale, who has kindly supplied the above notes, was surgeon of the *Eira* on both her voyages, and to his care of the health of the crew must in a great measure be ascribed the safe return of the whole party.—[ED.]

CORRESPONDENCE.

The Nomenclature of New Lands.

March, 1913.

I VENTURE to suggest that there should be some moderation in covering a coast-line with people's names with the word "Land" added—Smith, Jones, Brown, Robinson Lands, like advertisements on a hoarding. There is need for names to capes, bays, islets, peaks, and other natural features; but to cover a coast-line with "Lands" is unmeaning, unnecessary, and confusing.

Some of the Antarctic islands have suffered seriously from this advertising propensity. One is covered over with no less than eight "Lands." Graham Land has suffered still more.

But the "Lands" on the coast extending westwards from the Ross Sea beat everything. It has already got no less than thirteen scattered along it: Victoria, Adelie, Sabrina, Wilkes, North, Totten, Budd, Knox, Termination, Kaiser Wilhelm, Kempe, Enderby, Coates, and apparently more proposed.

It is right to give a name to a land when first discovered, and apparently isolated, but the name ought to disappear when it is found to be part of a known coast. Baring Land was properly named when McClure first sighted it, but it as properly disappeared as soon as it was found to be part of Banks island.

If King Edward VII. Land, one of Captain Scott's important discoveries, is found to be of great extent, reaching to Graham Land, an effort ought to be made to preserve the Edwardian coast from such unmeaning disfigurement.

The great Antarctic ice-cap needs no other name. It was discovered by Captain Scott. He alone has penetrated far into it, at right angles with the line of mountains, during one of the most remarkable Polar journeys on record. Three journeys have since been made quite on its outskirts, the third and last by the discoverer, Captain Scott himself. He alone had any right to give it a name. It only needs *one*. Captain Scott did not think it required any other name than the Antarctic Ice Cape. He was quite right. No one else has any right to disfigure it, or any part of it, with unnecessary names.

I submit that there ought to be some authority to check the redundancy of "Lands" and "Seas." The hydrographer has great power, because the charts issued by his department are more used than any other. Our Society has some power. Might not new names be required to have the sanction of the hydrographer and our Council before they are given a place on the Government charts and on our maps? The question is one of real importance to geographical students.

CLEMENTS R. MARKHAM.

Baltoro and Saltoro.

In the February number of the *Geographical Journal*, p. 175, Col. H. H. Godwin-Austen accuses me of introducing my "new spelling of Saltora and Baltora" in the December, 1912, *Journal*. I have introduced no new spelling for the words Saltoro and Baltoro. The mistake was purely a typographical error of my manuscript which in stress of work at the time was overlooked. It would not occur to me to change the final letter of either of these names.

The writer refers to "travellers having a limited knowledge of Oriental languages, dependent on interpreters, who range from Bombay cook-boys to Kashmiris." I would add that I do not class myself with such travellers. I have had many years' experience in Himalayan exploration, and have acquired a capacity and means of inquiry into the proper spelling of native names which places me quite beyond the pale of the ordinary Kashmir tourist.

FANNY BULLOCK WORKMAN.

Mountain Sickness.

Lima, Peru, January 10th, 1913.

In the *Journal* of December, 1912, there appeared a discussion on "Soroche" and its causes. In the enclosed letter* from Mr. Bryce Douglas on the same subject, two theories new to me are brought forward. Before leaving Lima, Mr. Douglas informed me he had no objection to the publication of any notes he might send me on mountain sickness.

H. S. Toppin, Captain 5th Fusiliers,
Peru-Bolivian Boundary Commission.

S.S. "Limari" at sea, January 25th, 1913.

In accordance with your request I have much pleasure in sending you the promised notes on "Soroche" or Mountain Sickness, known also in some parts as "Puna." In the year 1898, when in Bolivia for the first time, I found that mining people in the Oruro neighbourhood held the idea that there was some connection between "Soroche" and the more highly mineralized regions, and that the sickness was largely local, and one might be attacked by it at say 12,000 feet in one place and not at 14,000 in another. I also found that the sickness was known among the "Arrieros" plying between Tacna and La Paz as "Veta," this latter word, as you know, signifying "Lode" or "Vein," thus showing that they too connected the ailment in some way with regions which were highly mineralized. The Pass of Livichuco on the trail from Challapata to Sucre is known to contain large deposits of antimony, and is considered a bad place for "soroche" travellers dying on occasions when crossing it.

Of course this idea that minerals contribute to mountain sickness in any way may be absolute superstition and nothing more, but one often finds there is some reason underlying a notion of this sort. It occurs to me that as radium is known to discharge molecules, so in a like manner but on a much smaller scale large bodies of ores may do the same, and that some people are so constituted as to be peculiarly susceptible to their presence, in the same way that others have, apparently, the gift of water-divining. As regards the effects of Soroche, it is my experience that they vary considerably according to the person, some bleeding from the nose, others vomiting, and others gasping for breath. Naturally stout apoplectic persons suffer most, and two German friends of mine of this type died of "soroche."

My experience covers Ecuador, Peru, Bolivia and Chile, and the highlands of these countries are fairly well known to me, as I have paid them a good many visits since 1898, and have only just finished my 15th journey to Bolivia.

W. Bryce Douglas.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1912–1913.

Ninth Meeting, March 10, 1913.—Douglas W. Freshfield, Esq., Vice-President, in the Chair.

Elections.—*Mrs. Ames-Lyde; H.R.H. The Duchess of Aosta; Francis Maximilian Baer; Captain Cecil Banbury; John Oliver Borley; Miss Cara Buxton;*

* The letter has been condensed.—Ed.

Gerald Campbell; James Hugh Campbell; Alexander Morris Carr-Saunders; Miss Georgette Eleanor Christian; William Charles Walter Eakins; Graves William Eves; J. Campbell Forrester; Herbrand Harvey; William Martin Hertz; Mrs. Mary Inman; Joseph Willcox Jenkins; Edward Ernest Lay; Albert James Martin; Miss Annette Meakin; Captain Middleton Middleton; Manoel Humberto dos Passos-Treitas; R. A. F. Penrose; Miss Bessie Pullen-Burry; Mrs. Elsie Victoire Rainez; Mrs. Genevieve Ruxton; The Countess of Sefton; Miss Mary Charlotte Florence Stuart; James Alexander Tod; John Weir; Mrs. Agnes Weinberg; Mrs. Fanny Bullock Workman; Arthur Leonard Wrenford.

The paper read was:—

"The Arctic Islands and their Eskimo Inhabitants." By V. Stefansson.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Col. = Colonies.
Com. = Commerce.
C.R. = Comptes Rendus.
E. = Erdkunde.
G. = Geography, Géographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
Jb. = Jahrbuch.
Jber. = Jahresbericht.
k.k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. (Mém.) = Memoirs, Mémoires.
Met. (mét.) = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = (Riv.) = Review, Revue, Rivista.
S. = Society, Société, Selskab.
Sc. = Science(s).
Sitzb. = Sitzungsbericht.
T. = Transactions.
Ts. = Tijdschrift, Tidskrift.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Alps—Earthquake. **Schorn.**

Bericht über das Erdbeben in den Alpen vom 13. Juli 1910. Von Dr. Josef Schorn. (*Mitteilungen der Erdbeben-Commission der Kaiserl. A. W. in Wien, N. F.*, No. xlii.) Vienna: Alfred Hölder, 1911. Size 9½ × 6, pp. 77.

Alps—Glacier-survey. *Z. Gletscherkunde* **7** (1912): 1–36. **Gruber.**

Der Hochjochferner im Jahre 1907. Seine Vermessung in den Jahren 1907 und 1908. Von Dr. Otto Gruber. *Maps and Illustrations.*

Alps—Ice-age. *Z. Gletscherkunde* **6** (1912): 161–189. **Penck.**

Richard Lepsius über die Einheit und die Ursachen der diluvialen Eiszeit in den Alpen. Besprochen von Albrecht Penck.

Alps—Mont Blanc. *B.G. Hist. et Descriptive*, 1911: 80–96. **Mettrier.**

Le Mont Blanc vu de Dijon au XVI. siècle. Par H. Mettrier.

Alps—Plant-geography. *Deutsche Rundschau G.* **34** (1912): 465–478. **Stadlmann.**
Die Entwicklung der Pflanzengeographie der Ostalpen in den letzten zehn Jahren. Von Dr. Josef Stadlmann.

Alps—Population. *Deutsche Erde* **11** (1912): 96–109. **Pfaundler.**
Die Ergebnisse der Volkszählung vom 31. Dezember 1910 in den deutschösterreichischen Alpenländern. Von Dr. Richard v. Pfaundler.

Alps—Settlement. *G.Z.* **18** (1912): 443–454. **Krebs.**
Die bewohnten und unbewohnten Areale der Ost-Alpen. Von Norbert Krebs.
See note in the Monthly Record, January, 1913, p. 65.

Austria—Alps. *M. k.k. G. Ges. Wien* **55** (1912): 243–303. **Krebs.**
Die Verteilung der Kulturen und die Volksdichte in den österreichischen Alpen. Von Dr. Norbert Krebs. *Maps and Illustrations.*

Austria—Carinthia. *Deutsche Rundschau G.* **34** (1912): 259–270. **Stummer.**
Das Lurnfeld. Ein Beitrag zu dessen Monographie. Von Eduard Stummer. *Illustrations.*

Austria—Tirol—Cartography. *M. k.k. G. Ges. Wien* **55** (1912): 328–394. **Feuerstein.**
Die Entwicklung der Kartenbildes von Tirol bis um die Mitte des 16. Jahrhunderts. Von Dr. Arnold Feuerstein. *Map and Illustrations.*
See note in the March number, p. 282.

Austria-Hungary—Alps and Carpathians. **Martonne.**
B.G. Hist. et Descriptive (1911): 387–406.
Mission en Autriche-Hongrie (1911). Étude morphologique des Alpes Orientales (Tauern) et des Karpates Septentrionales (Tatra). Par Emmanuel de Martonne. *Sections and Diagrams.*

Balkan peninsula. *Petermanns M.* **58** (1912): II. 305–307. **Kreutzbruck v. Lilienfels.**
Der türkisch-serbische Kriegsschauplatz. Von Major O. Kreutzbruck v. Lilienfels. *Map.*

Balkan peninsula. *Deutsche Rundschau G.* **34** (1912): 497–510. **Meinhard.**
Aus Thrakien und dem südbulgarischen Rhodopegebirge. Von Friedrich Meinhard. *Illustrations.*

Belgium and Holland. **Baedeker.**
Belgium and Holland, including the Grand-Duchy of Luxembourg. Handbook for travellers, by Karl Baedeker. 15th edit. Karl Baedeker, 1910. Size 6½ × 4, pp. lxxxii. and 490. *Maps and Plans. Price 6s. net. Presented by the Editor.*

Carpathians. *B. Hungarian Geogr. S., Internat. Ed.* **38** (1910): 88–98. **Löwy.**
Orometrie der Fatra-Kriván. Von Emma Löwy. *Diagram.*

France—Alps—Morphology. *Z. Gletscherkunde* **6** (1912): 289–337. **Blanchard.**
Le Seuil de Rives. Etude de morphologie glaciaire. Par Raoul Blanchard. *Map and Illustrations.*

France—Ariège. *Ann. G.* **21** (1912): 118–129. **Cavaillès.**
La région montagneuse du Pays de Foix. Haute et moyenne Ariège. (Second article.) Par H. Cavaillès.

France—Atlantic coast. *B.S.G. de l'Est* **32** (1911): 213–222. **Bergon & Lalesque.**
Le Lac de Cazaux. Preuves géologiques et biologiques de son origine marine. Par Paul Bergon et Dr. F. Lalesque.

France—Glaciers. **Mougin.**
Ministère de l'Agriculture: Direction de l'Hydraulique et des Améliorations Agricoles. Service des Grandes Forces Hydrauliques (région des Alpes). Etudes glacialogiques. Tome II. Savoie.—Programme pour l'étude d'un grand glacier. (Etudes glacialogiques en Savoie, par M. Mougin.) [Paris], 1910. Size 11 × 7, pp. vi. and 140. *Maps, Diagrams, and Illustrations.*

France—Île de Bouin. *B.G. Hist. et Descriptive* (1911): 97–121. **Pawlowski.**
Les Transformations du Littoral Français. L'Île de Bouin (Vendée) à travers les Âges, d'après la géologie, la cartographie, et l'histoire. Par Auguste Pawlowski.

France—Indre et Loire. *B.G. Hist. et Descriptive* (1911): 203–211. **Chauvigné.**
Le territoire et les bois des Clérais. Par Auguste Chauvigné. *Map.*
The former extensive forests of the Clérais (Clarets, Clérets, etc.) are now represented by a narrow belt only, between the Indre and the Vienne.

France—Paris. **Baedeker.**

Paris and environs, with routes from London to Paris. Handbook for travellers, by Karl Baedeker. 18th edit. Leipzig: Karl Baedeker, 1913. Size 6½ × 4, pp. liv., 492, and 58. *Maps and Plans.* *Price* 6*s.* *Presented by the Editor.*

Germany—Bavaria—Alps. *M.G. Ges. München* **7** (1912): 317–421. **Aigner.**

Das Benediktenwandgebirge. Geologische neue Aufnahme der Lenggrieser-Berge vom Isartale bis hinüber zu den Bergen bei Kochel. Von Dr. P. Damasus Aigner. *Map.*

Germany—Bavaria—Alps. *M.G. Ges. München* **7** (1912): 211–279. **Dacqué.**

Geologische Aufnahme des Gebietes um den Schliersee und Spitzingsee in den oberbayerischen Alpen. Von Dr. E. Dacqué. *Map, Sections, and Illustration.*

Germany—Berlin. **Baedeker.**

Berlin and its environs. Handbook for travellers, by Karl Baedeker. Leipzig: Karl Baedeker, 1912. Size 6½ × 4, pp. x. and 254. *Maps and Plans.* *Price* 3*s.* *Presented by the Editor.*

Germany—Educational. *Z. Ges. Berlin* (1911): 601–625, 677–701. **Behrmann.**

Begleitworte zu den "40 Blättern der Karte des Deutschen Reiches 1:100,000, ausgewählt für Unterrichtszwecke, herausgegeben von der Königlich Preussischen Landesaufnahme." Von Dr. Walter Behrmann.

Germany—Frosts. *M.G. Ges. München* **7** (1912): 421–431. **Alt.**

Frostgrenzen und Frosthaufigkeit in Süddeutschland. Von E. Alt. *Map.*

Germany—Harz—Glaciation. *Petermanns M.* **58** (1912): II. 273–274. **Wünschmann.**

Die Vergletscherung des Harzvorlandes. Von Dr. K. Wünschmann. *Illustrations.*

Germany—Mecklenburg. *M.G. Ges. Rostock* **2** (1912): 5–113. **Tischbein.**

Beitrag zur Landeskunde des Warnowgebietes. Orographie, Geologie und Hydrographie. Von Dr. Harry Tischbein, Rostock. *Sections.*

Germany—Meteorology. *Sitzb. K. Preuss. A. W.* **18** (1912): 282–300. **Hellmann.**

Ueber den Charakter der Sommerregen in Norddeutschland. Von G. Hellmann. *Illustrations.*

Germany—Meuse. *B.S. Belge Geologie* **25** (1911): 348–352. **Pohlig.**

Une ancienne embouchure de la Meuse près de Bonn (2e partie). Par Hans Pohlig.

Germany, Northern. **Baedeker.**

Modern Germany as far as the Bavarian and Austrian frontiers. Handbook for travellers, by Karl Baedeker. 16th edit. Leipzig (London: T. Fisher Unwin), 1913. Size 6½ × 4, pp. xxxviii. and 440. *Maps and Plans.* *Price* 8*s. net.* *Presented by Mr. Unwin.*

Germany—Rainfall. **Götz.**

Forschungen deutschen Landes- u. Volkskunde **20** (1912): 252–294.

Die Niederschlagsverhältnisse zwischen Bodensee und Donau. Ein Beitrag zur Klimatographie des Niederschlags in dieser Gegend. Von Dr. J. Götz. *Maps.*

Germany—Rhine. **Mordziol.**

Die Rheinlande in naturwissenschaftlich-geographischen Einzeldarstellungen. Herausgegeben von Dr. C. Mordziol. Nr. 1. Die Austiefung des Rheindurchbruchtals während der Eiszeit. Von Dr. C. Mordziol. Braunschweig: E. Westermann, 1912. Size 8½ × 5½, pp. 44. *Maps, Illustrations, and Sections.* *Price* 1 *M.* *Presented by the Publisher.*

Germany—Villages. *M.G. Ges. Rostock* **2** (1912): 114–119. **Wolkenhauer.**

Die Formen der deutschen Dörfer und ihre Verbreitung. Von Dr. A. Wolkenhauer.

See note in the Monthly Record, *ante.*

Holland. **Grew.**

Rambles in Holland. By Edwin and Marion Sharpe Grew. London: Mills & Boon, [1913]. Size 8 × 5, pp. xii. and 340. *Sketch-map and Illustrations.* *Price* 6*s.* *Presented by the Publishers.*

Holland and Belgium—Hydrology. **Smedberg.**

Meddelanden från Hydrografiska Byrån. 2.—Hydrografi och vattenbyggnadskonst i Holland och Belgien. Af Richard Smedberg. Stockholm: P. A. Norstedt & Söner, 1912. Size 9½ × 6, pp. 51. *Illustrations.* *Price* 1.50 *kr.*

Hungary—Bodza river. *B. Hungarian G. S., Internat. Ed.* **38** (1910): 11–32. **Schilling.**
Die Bodzawendung. Von Gábor Schilling. *Map and Illustrations.*
On the bend of the Bodza in South-Eastern Hungary and its evolution.

Hungary—Mountains. **Cholnoky.**
B. Hungarian G.S., Internat. Ed. **38** (1910): 133–141.
Le Groupement des montagnes de la Hongrie. Par Dr. E. de Cholnoky.

Hungary—Settlement. *B. Hungarian G.S., Internat. Ed.* **38** (1910): 33–88. **Simko.**
Die Besiedelung von Nyiregyhaza und seiner Tanya's. Von Dr. Gyula Simkó. *Maps and Illustrations.*
Nyiregyhaza lies within the angle made by the Theiss and its tributary the Szamos.

Italy, Northern. **Baedeker.**
Northern Italy, including Leghorn, Florence, Ravenna, and routes through France, Switzerland, and Austria. Handbook for travellers, by Karl Baedeker. 14th edit. Leipzig (London: T. Fisher Unwin), 1913. Size 6½ × 4, pp. lxviii. and 698. *Maps and Plans. Price 8s. net. Presented by Mr. Unwin.*

Italy—Vesuvius. *Petermanns M.* **58** (1912); II. 274–275. **Friedlaender.**
Karten des Eruptionskegels des Vesuv und des Vesuvkraters. Von Immanuel Friedlaender. *Maps and Illustrations.*

Turkey. **Baker.**
The passing of the Turkish Empire in Europe. By Captain B. Granville Baker. London: Seeley, Service & Co., 1913. Size 9 × 5½, pp. 336. *Sketch-map and Illustrations. Price 16s. net. Presented by the Publishers.*

United Kingdom—Berkshire. **Field.**
The Radley district: its history, botany, entomology, and geology. Edited by the Rev. T. Field. Oxford: Parker & Son, 1912. Size 7 × 5, pp. vi. and 124. *Section. Price 2s. net. Presented by the Publishers.*

United Kingdom—Ireland—Dublin. **Joyce.**
The neighbourhood of Dublin: its topography, antiquities, and historical associations. By Weston St. John Joyce. Dublin: M. H. Gill & Son, 1912. Size 8½ × 5½, pp. xx. and 464. *Sketch-maps, Plans, and Illustrations. Price 7s. 6d. net. Presented by the Publishers.*

United Kingdom—Scotland—Forth Basin. **Cadell.**
The story of the Forth. By H. M. Cadell. Glasgow: James MacLehose & Sons, 1913. Size 10 × 7, pp. xviii. and 300. *Maps and Illustrations. Price 16s. net. Presented by the Publishers.*

United Kingdom—Text-book. **Elliott.**
An elementary historical geography of the British Isles. By M. S. Elliott. London: A. & C. Black, 1913. Size 7 × 4½, pp. x. and 172. *Sketch-maps and Illustrations. Price 1s. 6d. Presented by the Publishers.*

United Kingdom—Wales. **Marks.**
Gallant little Wales: sketches of its people, places, and customs. By Jeanette Marks. London: Constable & Co., 1912. Size 8 × 5, pp. xii. and 190. *Map and Illustrations. Price 5s. net. Presented by the Publishers.*
Pleasantly written sketches of Welsh life and scenery, intended as a sort of traveller's companion for North Wales.

ASIA.

Asia. *Fortnightly Rev.* **92** (1912): 655–662. **Landon.**
Tibet, China, and India. By Perceval Landon.

China. *B.S.G. l'Est* **32** (1911): 200–212. **Hubert.**
La Passe de Nan-Kau et la Grande Muraille, par Ch. Hubert.

China—Agriculture. **Van Loo.**
Royaume de Belgique. Premier Congrès International des Associations Agricoles et de Démographie Rurale à l'Exposition Universelle et Internationale de Bruxelles 1910. L'Agriculture en Chine. Rapport . . . présenté par M. Rodolphe van Loo. Brussels, 1910. Size 9½ × 6, pp. 37.

China—Archæology. *B.S.G. l'Est* **33** (1912): 16–37. **Hubert.**
Les Si-Ling ou Tombeaux de l'Ouest, par Ch. Hubert.

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Tombeau des Liang, Famille Siao. Ière partie. Siao Choen-Tche. Par le P. Mathias Tchang, S.J. (Variétés Sinologiques, No. 33.) Shanghai: Imprimerie de la Mission Catholique, 1912. Size 10 × 6, pp. xii. and 108. *Maps and Plates. Presented.*

China—Historical. *B.G. Hist. et Descriptive* (1911): 407–446. **Cordier.**
La mission de M. le Chevalier d'Entrecasteaux à Canton, en 1787, d'après les Archives du Ministère des Affaires étrangères. Par Henri Cordier.

Chinese Empire—Mongolia. *Z. Ges. E. Berlin* (1912): 561–588. **Granö.**
Die Nordwest-Mongolie. Eine geographische Skizze. Von Dr. J. G. Granö. *Illustration.*

Chinese Empire—Mongolia. *R.S. Belge d'Études Col.* **19** (1912): 759–772. **Verbrugge.**
Si-Wan-Ze (Mongolie). Par Dr. R. Verbrugge. *Map and Illustration.*
Si-wan-tse lies a day's ride from Kalgan.

French Indo-China—Cochin-China. ———
Publications de la Société des Études Indochinoises. Géographie physique, économique et historique de la Cochinchine. XIVe Fascicule—Monographie de la Province de Vinhlong. Saigon: C. Ardin, 1911. Size 9½ × 6½, pp. 36. *Map.*

India—Census. **Molony.**
Census of India, 1911. Vol. 11. Coorg. Report and Tables. By J. Chartres Molony. Madras, 1912. Size 13½ × 8½, pp. 50. *Map.*

India—Census. **Molony and Chatterton.**
Census of India, 1911. Vol. 12. Madras. (Two parts.) Part I. Report. By J. Chartres Molony. The section dealing with industries and industrial occupations in the Presidency, by Alfred Chatterton. Part II. Imperial and provincial tables. By J. Chartres Molony. Madras, 1912. Size 13½ × 8½, pp. (Pt. I.) iv. and 248; (Pt. II.), 290. *Maps.*

Japan—Usu Volcano. *Z. Ges. E. Berlin* (1911): 705–710. **Simotomai.**
Nachrichten über den Ausbruch des Vulkans Usu in Japan im Jahre 1910. Von H. Simotomai. *Map and Illustration.*

Malay Archipelago—Java. *Le Globe, S.G. Genève, Mém.* **51** (1912): 1–31. **Bernard.**
La culture du thé à Java. Par Ch. Bernard.

Malay Archipelago—Sunda Expedition. **Elbert.**
Jber. Frankfürter V. für G. u. Statistik **75** and **76** (1910–11 and 1911–12): 5–36.
Die wissenschaftlicher Ergebnisse der Sunda-Expedition. Von Dr. Johannes Elbert, Expeditions-Leiter. *Illustrations.*

Pamirs. *Petermanns M.* **58** (1912) II.: 261–265. **Schultz.**
Bericht über den bisherigen Verlauf meiner Pamirexpedition, 1911–12. Von Arved v. Schultz. *Illustrations.*

Persia—Historical. *J.R. Asiatic S.* (1912): 1–30, 311–339, 865–889. **Le Strange.**
Description of the province of Fars, in Persia, at the beginning of the twelfth century A.D. Translated from the MS. of Ibn-al-Balkhi in the British Museum by G. Le Strange.

Philippine Islands—Phytogeography. *Philippine J. Sc.* **7** (1912): C, 145–208. **Merrill.**
Notes on the flora of Manila, with special reference to the introduced element. By E. D. Merrill.

Russia—Caucasus. *Alpine J.* **26** (1912): 316–325. **Merkulof.**
Routes in the Western Caucasus: from V. A. Merkulof's guide.
The guide from which these routes are taken was reviewed in vol. 40, p. 73.

Russia—Siberia—Cartography. **Cahen.**
Nouvelles Archives Missions Sc. et Lit. . . . Nouvelle Série, fasc. 1, pp. 544.
Les Cartes de la Sibérie au XVIIIe Siècle. Essai de Bibliographie critique. Par M. Gaston Cahen.

Russia—Siberia—Geology. *B. Comité Géologique* **30** (1911): 421–476. **Wittenburg.**
Geologische Skizze der Halbinsel Murawijew-Amursky und der Insel Russky. Von P. v. Wittenburg. *Map and Sections.* [In Russian.]
This is the peninsula on which Vladivostok is placed.

Tian-Shan. *Deutsche Rundschau G.* **34** (1912): 241–248. **Machaček.**
Ueber einige Ergebnisse neuerer geografischer Forschung im Tian-schan. Von Dr. Fritz Machatschek.

Turkestan—Climate. *Meteorologische Z.* **29** (1912): 449–454. **Machaček.**
Zum Klima von Turkestan. Von Fr. Machatschek.
See note in the Monthly Record for January, p. 66.

Turkey—Asia Minor—Taurus. *Z. Ges. E. Berlin* (1911): 714–720. **Frech.**
Ueber den Gebirgsbau des Taurus. Briefliche Mitteilungen von Prof. Dr. F. Frech.

Turkey—Mesopotamia. *Deutsche Rundschau G.* **34** (1912): 524–534. **Banse.**
Im Osten Mesopotamiens (Bardâd-Môssul-Mardîn 1908). Von Ewald Banse. *Illustrations.*

Turkey—Mesopotamia—Historical. **Johns.**
Ancient Babylonia. By Dr. C. H. W. Johns. Cambridge: University Press, 1913. Size 6½ × 5, pp. viii. and 148. *Sketch-map and Illustrations. Price* 1*s. net. Presented by the Publishers.*

AFRICA.

Abyssinia. *Le Globe, S.G. Genève, Mém.* **51** (1912): 47–63. **Montandon.**
Traversée du massif éthiopien du désert Somali à la plaine du Soudan (1909–11). Étude comparée des zones parcourues et de leurs habitants. Par le Dr. George Montandon. *Map and Sections.*

Abyssinia—Economic. *B.S.G. l'Est* **33** (1912): 5–15. **Ferry.**
Les possibilités économiques de l'Ethiopie. Par René Ferry.

Africa—Colonization. **Darmstaedter.**
Geschichte der Aufteilung und Kolonisation Afrikas seit dem Zeitalter des Entdeckungen. Von Paul Darmstaedter. 1 Band. 1415–1870. Berlin, etc.: G. J. Göschen, 1913. Size 9½ × 6, pp. viii. and 320. *Sketch-maps. Price* 7*M.* 50. *Presented by the Publisher.*

Africa—Railways. *B.S. Languedoc. G.* **35** (1912): 90–119. **Leroy-Beaulieu.**
Les Chemins de fer transsahariens et transafricains. Par Paul Leroy-Beaulieu. *Map.*

Africa—Railways. *B.S.G. Com. Paris* **33** (1912): 164–192. **Roume.**
Les Chemins de fer en Afrique et le transafricain. Par V. E. Roume. *Map.*

Algeria—Plant-geography. **Rikli, Schröter, and others.**
Vierteljahrschrift Naturforschenden Ges. Zürich **57** (1912): 33–210.
Vom Mittelmeer zum Nordrand der Algerischen Sahara. Pflanzengeographische Exkursionen von M. Rikli und C. Schröter mit Beiträgen von Prof. Dr. C. Hartwick, Dr. Ed. Rübel, Prof. Dr. L. Rütimeyer, und von Herrn und Frau Dr. Schneider von Orelli. *Illustrations.*
The twenty-five plates give a vivid idea of the main types of the country and vegetation.

Belgian Congo—Ethnology. **Torday.**
Camp and tramp in African Wilds: a record of adventure, impressions, and experiences during many years spent among the savage tribes round Lake Tanganyika and in Central Africa, with a description of native life, character, and customs. By E. Torday. London: Seeley, Service & Co., 1913. Size 9 × 5½, pp. 316. *Map and Illustrations. Price* 16*s. net. Presented by the Publishers.*

Canary Isles—Teneriffe. *B.S. Languedoc. G.* **35** (1912): 129–164. **Mascart.**
Impressions et observations dans un voyage à Tenerife. Par Jean Mascart. *Illustrations.*

Central Africa. **Duke of Mecklenburg.**
Jber. Frankfurter V. für G. u. Statistik **75** and **76** (1910–11 and 1911–12): 92–100.
Meine Inner-Afrika-Expedition 1910–11. Von Seine Hoheit Herzog Adolf Friedrich zu Mecklenburg.

Egypt—Ethnology. *B.G. Hist. et Descriptive* (1911): 122–134. **Beaugé.**
Notes zur l'Égypte. Une race inconnue de l'Égypte actuelle. Par Ch. Beaugé.

Egypt—Libyan Desert. **Falls.**
Three years in the Libyan desert: travels, discoveries, and excavations of the Menas Expedition (Kaufmann expedition). By J. C. Ewald Falls. London: T. Fisher Unwin, [1913]. Size 9 × 5½, pp. xii. and 356. *Illustrations. Price* 15*s. net. Presented by the Publisher.*

Egypt—Soda deposits. **Lucas.**
Ministry of Finance, Egypt. Survey Department Paper, No. 22. Natural Soda Deposits in Egypt. By A. Lucas. Cairo, 1912. Size 10 × 7, pp. 30. *Map.*

French Equatorial Africa. *B.S.G. Rochefort* **34** (1912): 73–98. **Coffinières de Nordeck.**
Le Gabon. (Extrait des Souvenirs d'André Coffinières de Nordeck, capitaine de Vaisseau.)

French Sudan. **Zeltner.**
Nouvelles Archives Missions Sc. et Lit., N. S. fasc. **4** (1911): 18–52.
Mission dans le Sahel Soudanais. Par Fr. de Zeltner.

German East Africa—Kilimanjaro. *Z. Ges. E. Berlin* (1912): 513–522. **Lange.**
Eine Kibo-Besteigung. Von Max Lange. *Diagram.*
This ascent was made in 1909.

Liberia. *J. African S.* **12** (1912): 52–70. **Ellis.**
Liberia in the political psychology of West Africa. By George W. Ellis.

Morocco. *B. Union G. Nord de la France* **31** (1912): 65–81. **Lavoix.**
Sur les Confins Marocains. Par Jean Lavoix.

Morocco. *J. Manchester G.S.* **27** (1911: 101–108. **Mackenzie.**
A journey through nine Moorish Provinces. By Donald Mackenzie.

Morocco—Casablanca. *B.S.G. d'Alger, etc.* **16** (1912): 293–331. **Dessigny.**
Casablanca, Notice économique et administrative. Par Commandant Dessigny.

Morocco—Geology. *Ann. G.* **21** (1912): 130–158. **Gentil.**
La géologie du Maroc et la genèse de ses grandes chaînes. Par Louis Gentil. *Map.*

Nile—Evaporation. *Meteorologische Z.* **29** (1912): 454–462. **Türstig.**
Verdunstung auf dem Nil bei Khartum. Von R. Türstig.

Rhodesia—Minerals. *South African J. Sc.* **8** (1912): 389–398. **Zealley.**
A mineral survey of the zinc and lead deposits of Broken Hill, Northern Rhodesia. By Arthur E. V. Zealley. *Plans, Sections, and Illustrations.*

Ruwenzori. *M.G. Ges. Rostock* **2** (1912): 120–138. **Weiss.**
Am Ruwenzori. Von Hauptmann Dr. M. Weiss. *Illustrations.*
The writer took part in the Duke of Mecklenburg's expedition.

Sahara. *B.R.S.G. Madrid* **53** (1911): 211–228. **Conrotte.**
El Sahara marroqui y la Mauritania. Por Manuel Conrotte.

Sahara. *B.S.G. d'Alger, etc.* **16** (1911): 355–372. **Ardaillon.**
Notes sur les Touareg Ajjer. Aperçu sur l'oasis de Djanet et son utilisation au point de vue du commerce transsaharien. Par le Lieutenant Ardaillon. *Map.*

Sahara. *B.S.G. d'Alger, etc.* **16** (1912): 332–354. **Duclos.**
Rapport de tournée: In-Salah, Hassi-Boughessa, Fort Motylinsky, In-Salah. Par Lt. Duclos.

Sahara—Railway. *B.S.G. d'Alger, etc.* **17** (1912): 35–49. **Boyer.**
De Duponchel à Berthelot: historique du Transsaharien. Par L. Boyer.

Sahara—Railways—Expedition. *B.S.G. Com. Paris* **34** (1912): 625–630. **Chudeau.**
Mission d'études des chemins de fer transafricains. Par René Chudeau. *Map.*

South Africa—Cape Colony. **Bartlett.**
Min. of P.I. Civil Engineers **188** (1912): 283–325.
Investigations relating to the yield of a catchment-area in Cape Colony. By Edward Cecil Bartlett. *Map and Diagrams.*

Spanish West Africa. *Rev. G. Col., R.S.G. Madrid* **8** (1911): 249–261. **Flores.**
Guinea Española: Viajes de estudio en las Islas y en el Continente. (Por Emilio Gómez Flores.)

Sudan—Ethnology. **Tremearne.**
Hausa superstitions and customs: an introduction to the folk-lore and the folk. By Major A. J. N. Tremearne. London: Bale, Sons & Danielsson, 1913. Size 9½ × 5¾, pp. xvi. and 548. *Illustrations. Price* 21*s. net. Presented by the Publishers.*

Transvaal—Rand. *Min. of P.I. Civil Engineers* **188** (1912): 249–282. **Leitch.**
The water-supply of the Witwatersrand. By Donald Calder Leitch. *Map and Illustrations.*

Tunis—Utica. *B.G. Hist. et Descriptive* (1911): 212–242. **Bernard.**
Le Golfe d'Utique et les bouches de la Medjerdah. Par le Capitaine Bernard. *Maps.*
On changes wrought by the Mejerda and its deposits.

West Africa—Boundaries. *L'Afrique Française* **22** (1912): 335–340. **Terrier.**
Les Frontières de la Guinée Française, de Sierra Leone et du Liberia. Par Auguste Terrier. *Maps.*
See note in the December number, 1912, p. 643.

West Africa—Communications. *Mouvement G.* **29** (1912): 481–486. **Wauters.**
Les voies d'accès au Lac Tchad. Par A. J. Wauters. *Sketch-maps.*

West Africa—Earth-eaters. *B.S.G. de l'Est* **32** (1911): 219–225. **Hubert.**
Les Populations Géophages de l'Afrique Occidentale. Par Henry Hubert.

West Africa—Languages. **Migeod.**
The languages of West Africa. Vol. 2. By Frederick William Hugh Migeod. London: K. Paul & Co., 1913. Size 9 × 5½, pp. x. and 436. *Price* 12*s.* 6*d. net.*

NORTH AMERICA.

Canada. *J. United Service I. India* **41** (1912): 407–432. **Twining.**
The Dominion of Canada. By Lieut.-Colonel P. G. Twining. *Maps.*

Canada—British Columbia—Geology. **Le Roy.**
Canada, Department of Mines. Geological Survey Branch. Memoir No. 21. The geology and deposits of Phœnix boundary district, British Columbia. By O. E. Le Roy. Ottawa, 1912. Size 10 × 6½, pp. 110. *Maps, Sections, Plans, and Illustrations.*

Canada—Handbook. **Heaton and Robinson.**
Heaton's Annual. The Commercial Handbook of Canada and Board of Trade Register. Eighth year, 1912. Edited by Ernest Heaton and J. Beverley Robinson. Toronto (London: Simpkin, Marshall, Hamilton, Kent & Co.), 1912. Size 7½ × 5, pp. xxii. and 562. *Presented by Captain F. V. Longstaff.*

Canada, North-West. **Stewart.**
Down the Mackenzie and up the Yukon in 1906. By Elihu Stewart. London: John Lane, 1913. Size 7½ × 5, pp. 270. *Map and Illustrations. Price* 5*s. net. Presented by the Publisher.*

Canada—Quebec. *B.S.G. Quebec* **6** (1912): 303–314. **Bourinot.**
La rivière du Désert. Par J. G. Bourinot.
This river, a secondary northern tributary of the Ottawa, drains a little-frequented district in western Quebec.

Canada—Quebec. *B.S.G. Québec* **6** (1912): 296–299. **Sulte.**
La plus ancienne carte de la province de Québec. By Benjamin Sulte.

Canada—Vancouver Island. **Clapp.**
Canada, Department of Mines. Geological Survey Branch. Memoir No. 13. Southern Vancouver Island. By Charles H. Clapp. Ottawa, 1912. Size 10 × 6½. pp. 202. *Map, Illustrations, and Sections.*
See note in the March number, p. 285.

United States—Mines. *U.S. Geol. Surv. B.* **507** (1912): pp. 310. **Hill and Lindgren.**

The mining districts of the Western United States. By James M. Hill, with a geologic introduction by Waldemar Lindgren. *Maps.*

United States—Mississippi—Flood. *B. American G.S.* **44** (1912): 645–657. **Brown.**

The Mississippi river flood of 1912. By Robert M. Brown. *Sketch-maps.*

United States—Nevada. *Sierra Club B.* **8** (1912): 249–259. **Church.**

A midwinter trip through Nevada's Mountain Park. By J. E. Church. *Illustrations.*

United States—New Mexico and Arizona. **Keyes.**

Popular Sc. Monthly **81** (1912): 227–237.

Wind-graved Mesas and their message. By Dr. Charles R. Keyes. *Illustrations.*

United States—Virginia. *J.R. Artillery* **39** (1912): 211–225. **Sedgwick.**

A visit to some battlefields in Northern Virginia. By Captain F. R. Sedgwick. *Maps.*

CENTRAL AND SOUTH AMERICA.

Central America. **Périgny.**

Nouvelles Archives Missions Sc. et Lit., N.S., Fasc. **4** (1911): 1–15.

Mission dans l'Amérique Centrale 1909–10, par M. Maurice de Périgny. *Illustrations and Diagrams.*

Chile. **Caddick.**

The republic of Chile: a popular description of the country, its people, and its customs. By David W. Caddick. London: A. H. Stockwell, [1912]. Size 7½ × 5, pp. 64. *Price* 1*s. net. Presented by the Publisher.*

Panama Canal. **Cornish.**

The Panama Canal and the philosophy of landslides. (Extract from the *Edinburgh Review*, January, 1913.) London, 1913. Size 8½ × 5½, pp. 21–42. *Presented by the Author.*

Peru—Archæology. **Berthon.**

Nouvelles Archives Missions Sc. et Lit., N.S., Fasc. **4** (1911): 53–122.

Etude sur le Précolombien du Bas-Pérou. Par le Capitaine Paul Berthon. *Illustrations (some coloured) and Diagrams.*

Peru—Mountain-dwellers. *Deutsche Rundschau G.* **34** (1912): 478–487. **Sievers.**

Zur Kenntnis der Bevölkerung der Sierra von Nordperu. Von Wilhelm Sievers. *Illustrations.*

Peru—Vitcos. **Bingham.**

Vitcos, the last Inca capital. By Hiram Bingham. (Reprinted from the *Proceedings of the American Antiquarian Society* for April, 1912.) Worcester, Mass., 1912. Size 10 × 6½, pp. 64. *Plans and Illustrations.*

See review in the December number, p. 636.

South America. *Z. Ges. E. Berlin* (1912): 498–513. **Seler.**

Meine Reise durch Süd-Amerika im Jahre 1910. Von E. Seler.

South America. *M.G. Ges. Rostock* **2** (1912): 139–159. **Ule.**

Eine Studienreise nach Südamerika. Von Prof. Dr. Willi Ule. *Map.*

The author touched at various points on the Brazilian coast and crossed from Buenos Aires to the opposite side of the continent.

South America—Ethnology. **Church and Markham.**

Aborigines of South America. By the late Colonel George Earl Church. Edited by . . . Clements R. Markham, K.C.B. London: Chapman & Hall, 1912. Size 9 × 6, pp. xxiv. and 314. *Map and Portrait. Price* 10*s.* 6*d. net. Presented by the Publishers.*

AUSTRALASIA AND PACIFIC ISLANDS.

Australasia. **Sargent.**

Australasia. Eight lectures prepared for the Visual Instruction Committee of the Colonial Office. By A. J. Sargent. London: G. Philip & Son, 1913. Size 7½ × 5, pp. viii. and 152. *Sketch-maps and Illustrations. Price* 1*s. net. Presented by the Publishers.*

Australia—Eastern—Geology. *P.R.S. Queensland* **23** (1912): 149–198. **Jensen.**
The building of Eastern Australia. By Dr. H. I. Jensen. *Sketch-maps and Sections.*

Caroline Islands—Ponape. **Hambruch.**
Jber. Frankfurter V. für G. u. Statistik **75** and **76** (1910–11 and 1911–12): 79–86.
Ponape. Von Dr. Paul Hambruch.

Caroline and Marianne Islands. *Z. Kolonialpolitik, etc.* **14** (1912): 610–629. **Schnee.**
Bilder aus den Karolinen und Marianen. Von Dr. Schnee. *Illustrations.*

New Guinea, Dutch. **Rawling.**
The land of the New Guinea pygmies; an account of the story of a pioneer journey of exploration into the heart of New Guinea. By Captain C. G. Rawling. London: Seeley, Service & Co., 1913. Size 9 × 5½, pp. 366. *Map and Illustrations. Price* 16*s. net. Presented by the Publishers.*

New Zealand—Survey. **Strauchon.**
Report of the Department of Lands and Survey, New Zealand, for the year 1911–12. By John Strauchon. Wellington, 1912. Size 13½ × 8, pp. xiv. and 72. *Portrait, Maps, and Illustrations.*
Includes a first report on the Warawara State Forest.

New Zealand—Survey. **Mackenzie.**
New Zealand. Department of Lands and Survey. Report on the Survey Operations for the year 1911–12. By James Mackenzie. Wellington, 1912. Size 13 × 8, pp. 22. *Maps, Diagrams, and Illustrations.*

Queensland—Vulcanicity. *P.R.S. Queensland* **23** (1912): 139–148. **Marks.**
Notes on the geological age of volcanic activity in South-East Queensland. By E. O. Marks.

Samoa—Savaii. *Z. Ges. E. Berlin* (1911): 701–704. **Sapper and others.**
Das Ende des Matavanu-Ausbruchs auf Savaii. Nach Mitteilungen von Dr. W. Grevel und Pater Mennel. Von Dr. K. Sapper.
See note in vol. **39**, p. 288.

Western Australia—Laterite. *Geol. Mag.* Dec. V., **9** (1912): 399–406. **Simpson.**
Notes on laterite in Western Australia. By Edward S. Simpson. *Sketch-map and Section.*

POLAR REGIONS.

Antarctic—Amundsen Expedition. *Z. Ges. E. Berlin* (1912): 481–498. **Amundsen.**
Meine Reise zum Südpol. Von Roald Amundsen. *Illustration.*

Arctic—Geology. **Nathorst.**
Die oberdevonische Flora des Ellesmere-Landes. Von A. G. Nathorst. *Illustrations.* (In *Report of the Second Norwegian Arctic Expedition in the "Fram,"* 1898–1902, vol. **1** (1907), No. 1, pp. 22.)

Arctic—Magnetic observations. **Steen.**
Terrestrial magnetism. By Aksel S. Steen. (In *Report of the Second Norwegian Arctic Expedition in the "Fram,"* 1898–1902, vol. **2** (1907), No. 6, pp. 82.)

Arctic—Meteorology. **Mohn.**
Meteorology [of the Second Norwegian Arctic Expedition.] By H. Mohn. (In *Report of the Second Norwegian Arctic Expedition in the "Fram,"* 1898–1902, vol. **1** (1907), No. 4, pp. 400.)

Arctic—Phytogeography. **Simmons.**
The vascular plants in the flora of Ellesmere-Land. By H. G. Simmons. *Map and Illustrations.* (In *Report of the Second Norwegian Arctic Expedition in the "Fram,"* 1898–1902, vol. **1** (1907), No. 2, pp. 198.)

Greenland. **Isachsen.**
Astronomical and geodetical observations. By Gunnar Isachsen. *Maps and Illustrations.* (In *Report of the Second Norwegian Arctic Expedition in the "Fram,"* 1898–1902, vol. **2** (1907), No. 5, pp. 142.)

Greenland—Phytogeography. **Simmons.**
A revised list of the flowering plants and ferns of North-Western Greenland, with some short notes about the affinities of the flora. By H. G. Simmons. *Sketch-*

map. (In *Report of the Second Norwegian Arctic Expedition in the "Fram,"* 1898–1902, vol. 3 (1911), No. 16, pp. 110.)

Spitsbergen—Commercial. *Scottish G. Mag.* **28** (1912): 561–571. **Brown.**
The commercial development of Spitsbergen. By Dr. R. N. Rudmose Brown. *Illustrations.*

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Compass. **Evans and Smith.**
Admiralty Manual for the deviations of the compass. Originally edited in 1862 by F. J. Evans and Archibald Smith. 7th edit. London: J. D. Potter, 1901. (Reprinted 1912.) Size 9½ × 6, pp. x. and 216. *Charts and Diagrams. Price* 3*s. Presented by the Admiralty.*

Geophysics. **Poynting.**
The Earth: its shape, size, weight, and spin. By Dr. J. H. Poynting. Cambridge: University Press, 1913. Size 6½ × 5, pp. vi. and 142. *Diagrams. Price* 1*s. Presented by the Publishers.*

Latitude determination. *Petermanns M.* **58** (1912): II. 271–273. **Schoy.**
Näherungsweise Bestimmung der Polhöhe in sehr hohen Breiten. Von Dr. Karl Schoy. *Diagrams.*

Lunar attraction. *B.A. Imp. Sc. St. Pétersbourg,* 6 Série (1910): 775–784. **Orlov.**
Observations sur les déformations de la terre sous l'influence de l'attraction de la lune faites à Jurjev à l'aide des pendules horizontaux de Zöllner. Par A. J. Orlov. [In Russian.]

Meteorology. **Berry.**
The atmosphere. By A. J. Berry. Cambridge: University Press, 1913. Size 6½ × 5, pp. vi. and 146. *Illustrations. Price* 1*s. net. Presented by the Publishers.*

Navigation. **Noble.**
The speed and current chronographer. By Captain A. G. Noble. Liverpool: C. Birchall, Ltd., 1913. Size 5 × 3½, pp. xii. and 376. *Presented by the Author.*

Physical Geography. **Buchanan.**
Scientific papers. By J. Y. Buchanan. Vol. 1. Cambridge: University Press, 1913. Size 9 × 5½, pp. xii. and [314]. *Portrait, Maps, and Diagrams. Price* 10*s.* 6*d. net. Presented by the Author.*
Nearly all the papers in the present volume are concerned with oceanography.

Survey. *M.G. Ges. München* **7** (1912): 145–210. **Scheck.**
Einfache und stereoskopische Bildmessung im reinen Felsgebiete. Von Dr. ing. F. Scheck. *Map and Diagrams.*
A precise large-scale survey by photographic methods in the Bavarian limestone Alps.

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Climatology—Desiccation. *B.S.R. Belge G.* **35** (1911): 437–441. **Dumas.**
La Dessiccation du Globe. Par Léon Dumas.

Geology—Composition of the Crust. *P. American Phil. S.* **51** (1912): 206–234. **Clarke.**
Some geochemical statistics. By Frank Wigglesworth Clarke.

Geology—Intrusions. *Sitzb. K. Preuss. A.W.* **38** (1912): 707–735. **Branca.**
Müssen Intrusionen notwendig mit Aufpressung verbunden sein? Mit kurzer Anwendung auf das vulkanische Ries bei Nördlingen. Von W. Branca.

Geomorphology. *B.S.G. de l'Est.* **32** (1911): pp. 116–122. **Vidal de la Blache.**
De l'interprétation géographique des paysages. Par P. Vidal de la Blache.

Glacial Epoch. *B.S. Belge Géologie* **24** (1910): 292–305. **Krischtafowitsch.**
Sur la dernière période glaciaire en Europe et dans l'Amérique du Nord en rapport avec la question de la cause des périodes glaciaires en général. Par N. J. Krischtafowitsch.

Glaciers. *Z. Gletscherkunde* **7** (1912): 37–47. **Rabot and Muret.**
Les Variations périodiques des Glaciers. XVII^me^ Rapport, 1911. Par Charles Rabot et E. Muret.

Glaciers—Erosion. *Z. Gletscherkunde* 6 (1912): 212–214. **Reckstad.**

Die Ausfüllung eines Sees vor dem Engabrä (Svartisen) als Mass der Gletschererosion. Von J. Reckstad. *Illustrations.*

Glaciers—Ice in Moraines. *Z. Gletscherkunde* 6 (1912): 338–343. **Klebelsberg.**

Totes Gletschereis als Bestandteil der Moränenlandschaft. Von R. v. Klebelsberg.

Glaciers—Radiation. *Z. Gletscherkunde* 6 (1912): 189–195. **Buchanan.**

Beobachtungen über die Einwirkung der Strahlung auf das Gletschereis. Von J. Y. Buchanan.

Magnetism. *Deutsche Rundschau G.* 34 (1912): 488–489. **Krebs.**

Neue Unternehmungen zur magnetischen Aufnahme der Erde. Von Wilhelm Krebs. *Map.*

The map brings together in a useful way the results of recent surveys.

Meteorology—Atmospheric circulation. **Defant.**

Sitzb. K.A.W. Wien, Math.-Naturwiss. Klasse 121 (1912): 379–585.

Die Veränderungen in der allgemeinen Zirkulation der Atmosphäre in den gemassigten Breiten der Erde. Von Dr. A. Defant. *Diagrams.*

Meteorology—Rainfall. *B.S.R. Belge G.* 35 (1911): pp. 442–451. **Dumas.**

La Pluie normale théorique. Par Léon Dumas. *Diagram.*

Meteorology—Wind. **Hann.**

Sitzb. K.A.W. Wien Math.-Naturwiss. Klasse 121 (1912): 185–220.

Die täglichen Änderungen der Windstärke auf dem Gipfel des Ben Nevis (und des Tsukubasan, im Anhang). Von J. v. Hann.

Based on the observations printed in the *Trans. R. Soc. Edinburgh.* The appendix deals briefly with similar observations on the peak of Tsukubasan, Japan.

Seismology. **Scheu.**

Monographies de quelques grands sismes de l'année 1907. Par E. Scheu. (Extrait des Publications du Bureau Central de l'Association Internationale de Sismologie, Serie B, Catalogues. 1912.) Strassburg, 1912. Size 10½ × 7½, pp. 36. *Sketch-maps.*

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Colonization. **Lucas.**

Greater Rome and Greater Britain. By Sir C. P. Lucas. Oxford: Clarendon Press, 1912. Size 9 × 6, pp. vi. and 184. *Price* 3*s.* 6*d. Presented by the Publishers.*

Commercial. *Ann. de G.* 21 (1912): 109–117. **Hitier.**

Les progrès du commerce international des "denrées périssables." Par Hitier.

Commercial—Treaties. **Bernhardt.**

Handbook of commercial treaties, etc., between Great Britain and Foreign Powers. Compiled and edited by Gaston de Bernhardt. London: Wyman & Sons, 1912. Size 10 × 6, pp. xxiv. and 1156. *Price* 10*s.*

Historical. *Petermanns M.* 58 (1912) II.: 245–247. **Günther.**

Historische Geographie und Geschichte der Erdkunde. Von Prof. Dr. S. Günther.

History of Cartography. *B.G. Hist. et Descriptive* (1911): 314–318. **De La Roncière.**

Le Portulan du XV^e^ siècle découvert à Gap, par Charles de la Roncière.

This chart belongs to the Majorcan School, and may be regarded as the prototype of a number of known examples, *e.g.*, those of the family of Olives.

History of Cartography. *B.G. Hist. et Descriptive* (1911): 319–323. **Guillaume.**

Note sur un portulan de la Mediterranée et d'une partie de l'Atlantique, par P. Guillaume.

A fifteenth-century chart on parchment, found in use as a wrapper for a volume of minutes in the archives of Briançon.

History of Cartography. *Z. Ges. E. Berlin* (1912): 522–527. **Preradović.**

Ein handschriftlicher Kartenatlas des Königl. Landesarchivs zu Agram. Von K. u. K. Linienschiffskapitän a. D. D. v. Preradović.

This atlas, which contains seven "compass charts" on parchment, appears to date from the close of the sixteenth century.

BIOGRAPHY.

Agassiz. *P. American A. Arts and Sc.* **48** (1912): 31-44. **Walcott.**
Alexander Agassiz. By Henry P. Walcott.

Hooker. *P.R.S.* Ser. B. **85** (1912): i.-xxxv. **Thiselton-Dyer.**
Sir Joseph Dalton Hooker, 1817–1911. [By Sir W. T. Thiselton-Dyer.] *Portraits.*

Krümmel. *Petermanns M.* **58** (1912) II.: 281. **Meinardus.**
Otto Krümmel. Von Prof. Dr. W. Meinardus. *Portrait.*

Le Testu. *B.G. Hist. et Descriptive* (1911): 135–202. **Anthiaume.**
Un pilote et cartographe Havrais au XVI^e^ siècle, Guillaume le Testu, par l'Abbé A. Anthiaume. *Illustrations.*

Livingstone.
Memorials of David Livingstone. A Souvenir of the Livingstone Centenary. Issued by Livingstone College, Leyton. London: Marshall Bros., 1913. Size 7½ × 5, pp. [41]. *Portraits and Illustrations. Presented by the Livingstone College.*

Messerschmitt. *M.G. Ges. München* **7** (1912): 432–437. **Lutz.**
Johann Baptist Messerschmitt. Von C. W. Lutz. *Portrait.*
Prof. Messerschmitt, who died on April 13, 1912, was Director of the Magnetic Observatory and of the Earthquake Station in Munich. He was well known as a writer on geophysical subjects.

GENERAL.

British Empire. **Langenbeck.**
Englands Weltmacht in ihrer Entwicklung vom 17. Jahrhundert bis auf unsere Tage. Von Wilhelm Langenbeck. 2. Auflage. Leipzig, etc.: B. G. Teubner, 1913. Size 7½ × 5, pp. viii. and 124. *Illustrations. Price* 1 *M.* 25. *Presented by the Publisher.*

Eastern Lands. *J.R. Artillery* **39** (1912): 195-204. **Mackinder**
The strategical geography of the Near East. By H. J. Mackinder.

Education—Text-book. **Finch.**
Questions and exercises in geography. (Based on Heaton's "Scientific Geographies.") IV. North America. By Robert J. Finch. London: Ralph, Holland & Co., [1913]. Size 7½ × 5, pp. 48. *Price* 4*d. net. Presented by the Publishers.*

Education—Text-book. **Heaton.**
A scientific geography. Book VIII. South America. By Ellis W. Heaton. London: Ralph, Holland, & Co., [1913], Size 7½ × 5, pp. 90. *Sketch-maps and Sections. Price* 1*s. net. Presented by the Publishers.*

Geography. **Huntington.**
The new science of Geography. By Ellsworth Huntington. (Extract from the *Yale Review*, October, 1912.) New Haven, 1912. Size 10½ × 6½, pp. 82–96. *Presented by the Author.*

Geography. *B.R.S.G. Madrid* **53** (1911): 129–169. **Tower.**
Geografia cientifica. Por Walter S. Tower.

Index. **Raveneau**
Annales de Géographie. Deuxième table décennale 1902-11. Dressée par Louis Raveneau. Paris: A. Colin, 1912. Size 10 × 6½, pp. 84. *Price* 5 *fr.*
An excellently arranged analytical index to the contents of the ten volumes. The entries are first grouped by subjects and countries, under the main headings of (1) articles, notes, etc.; (2) maps and diagrams; (3) photographs; an alphabetical index of authors coming last. With the previous index to the first ten volumes, it will form a valuable guide to the progress of geography during the past twenty years.

Statistics. **Birot.**
Statistique annuelle de géographie humaine comparée, 1912. Par Jean Birot. Paris: Hachette et Cie., 1912. Size 8½ × 5½, pp. 32.

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

EUROPE.

British Isles—England and Wales. **Ordnance Survey.**

Sheets published by the Director-General of the Ordnance Survey, from February 1 to 28, 1913.

1-inch map :—

England and Wales. 3rd edition, engraved in outline. Sheet 69. *Price* 1*s.*

6-inch maps :—

Revised quarter-sheets, with contours in blue. *Price* 1*s. each.*
Berkshire, 6 sheets. **Cheshire**, 1 sheet. **Hampshire**, 3 sheets. **Lancashire**, 1 sheet. **Sussex**, 1 sheet. **Yorkshire**, 5 sheets.

1 : 2500 scale maps :—

Revised, with houses stippled, and with areas. *Prices* 1*s.* 6*d. and* 3*s. each.*
Berkshire, 43 sheets. **Carnarvonshire**, 23 sheets. **Denbighshire**, 80 sheets. **Flintshire**, 5 sheets. **Lancashire**, 11 sheets. **Middlesex**, 13 sheets. **Oxfordshire**, 16 sheets. **Surrey**, 31 sheets. **Westmorland**, 4 sheets. **Yorkshire**, 60 sheets.

(*E. Stanford, Ltd., London Agents.*)

British Isles—London. **Cook and Hammond.**

Map of the Railways of London and Suburbs, showing railways open, authorized, and constructing, together with those proposed for session 1913. Scale 1 : 21,120 or 3 inches to 1 stat. mile. Compiled by Cook and Hammond. Westminster, 1913. *Price* 5*s.*

British Isles—London. **Stanford.**

A map showing proposed Railways, Tramways, and other schemes affecting London in connection with Bills where plans have been deposited with the London County Council, Session 1913. Scale 1 : 63,360 or 1 inch to 1 stat. mile. London: E. Stanford, Ltd., 1913. *Price* 2*s.*

British Isles—Scotland. **Johnston.**

Bathy-orographical map of the Forth and Tay. Scale 1 : 126 720 or 1 inch to 2 stat. miles. Constructed and engraved by W. & A. K. Johnston, Ltd., Edinburgh and London, [1913]. *Price, mounted on cloth, rollers, and varnished,* 12*s. Presented by the Publishers.*

A good useful wall map, including that part of Scotland between Selkirk and Montrose in a north-and-south direction and extending from Loch Lomond on the west to the east coast. The relief is shown by tinted contours in green and brown, and depths of water in blue. For the land heights the contour intervals in feet are : sea-level to 300, 300–500, 500–1000, 1000–1500, 1500–2000, 2000–3000. On the sea the tints show sea-level to 10 fathoms, 10–20 fathoms, and below 20 fathoms. The map is clear and not overcrowded.

Bulgaria. **Peucker.**

Königreich Bulgarien und die zentralen Balkanländer zwischen Adria und Pontus. Auf Grundlage der Scheda'schen Karte. II. Ausgabe. Bearbeitet von Dr. Karl Peucker. Scale 1 : 864,000 or 1 inch to 13·6 stat. miles. Vienna : Artaria & Co., 1913. *Presented by the Publishers.*

This is an important map at the present time in connection with the Balkan war. Upon the basis of Scheda's well-known map of the Balkan peninsula. Dr. Karl Peucker has shown in a diagrammatic manner, by various colours and symbols, the parts of Turkey now claimed by Bulgaria, Servia, Greece, and Montenegro, as well as the boundary claimed by Albania for the proposed independent state, the modified northern boundary of Bulgaria according to the claims of Rumania, and the suggested limitation of Turkish territory to the area in the neighbourhood of Constantinople.

Europe. **Bacon.**

Bacon's Library Map of Europe. Scale 1 : 4,000,000 or 1 inch to 63·1 stat. miles. 4 sheets. London: G. W. Bacon & Co., Ltd., [1913]. *Price, mounted on rollers and varnished,* 25*s. Presented by the Publishers.*

A large wall map in four sheets measuring, when joined as one, 50 inches by 62 inches. The boundaries and information as to sailing tracks, etc., are up to date, but the basis of the map, specially the relief, is much behind the times.

France. **Michelin.**

Carte Michelin. France en 47 Feuilles au 200,000 (1 inch to 3·2 stat. miles). Sheets: 3, Amiens-Arras; 8, Brest; 12, Nancy; 14, Rennes; 18, Nantes; 19, Tours; 22, La Roche-sur-Yon; 23, Poitiers-Bourges; 26, La Rochelle; 30, Angoulême; 31, Perigueux-Tulle. Paris: Ch. Delagrave, [1910]. *Price* 1.25 *fr. each sheet.*

France. **Ministre de l'Interieur.**

Carte de France dressée par ordre du Ministre de l'Interieur. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Sheets: IX.–18, Châteaubriant; IX.–36, St. Jean-Pied-de-Port; XI.–12, Caen; XI.–26, Cognac; XIV.–9, Dieppe; XVI.–10, Breteuil; XVI.–34, Castres; XVI.–39, Saillagouse; XVII.–13, Paris (Est); XIX.–18, Vermenton; XIX.–34, Clermont-l'Hérault; XXI.–30, Privas; XXIII.–13, Commercy; XXVI.–27, Lanslebourg. New editions. Paris: Hachette & Cie., 1912. *Price* 0.80 *fr. each sheet.*

France. **Service Géographique de l'Armée.**

Carte de France. Scale 1 : 200,000 or 1 inch to 3·2 stat. miles. Sheets: 2 bis, Anvers; 5 bis, Aix-la-Chapelle; 5 ter, Coblentz; 8, Abbeville; 9, Amiens; 10, Mézières; 11, Longwy; 15, Rouen; 16, Paris; 17, Châlons; 22, Rennes; 23, Alençon; 24, Chartres; 25, Melun; 27, Nancy; 30, Vannes; 31, Angers; 32, Tours; 33, Orléans; 34, Dijon; 35, Vesoul; 38, La Roche-sur-Yon; 39, Châteauroux; 40, Bourges; 41, Autun; 42, Besançon; 43, Les Sables d'Olonne; 44, La Rochelle; 45, Poitiers; 47, Mâcon; 48, Annecy; 51, Limoges; 52, Clermont; 53, Lyon; 54, Grenoble; 56, Bordeaux; 58, Lé Puy; 60, Gap; 66, Avignon; 67, Digne; 70, Tarbes; 71, Toulouse; 72, Carcassone; 73, Montpellier; 74, Mareille; 76, Luz; 78, Perpignan. Paris: Service Géographique de l'Armée, 1912–13. *Price* 1.50 *fr. each sheet.*

France. **Service Géographique de l'Armée.**

Carte des Chemins de Fer Français. Scale 1 : 800,000 or 1 inch to 12·6 stat. miles. 4 sheets. Paris: Service Géographique de l'Armée, 1912. *Price* 1.50 *fr. each sheet.*

Germany. **Vogel.**

Karte des Deutschen Reichs im Massstab. 1 : 500,000 (1 inch to 7·8 stat. miles) unter Redaktion von Dr. C. Vogel. Sheets: 6, Emden; 17, Köln. Gotha: Justus Perthes, 1912. New editions.

Holland. **Beekman.**

Geschiedkundige Atlas van Nederland. Uitgegeven door de Commissie voor den Geschiedkundigen Atlas van Nederland en geteenkende door het lid der Commissie A. A. Beekman. De Republiek in 1795. Sheets 2, 4, 5, 15. The Hague: M. Nijhoff, [1913].

Four additional sheets of the historical atlas of the Netherlands which has been previously noticed in the *Geographical Journal.*

ASIA.

Indian Government Surveys. **Surveyor-General of India.**

Maps published by the Survey of India during the quarter ending December 31, 1912. India and adjacent countries (without hills), scale 1 inch to 128 miles. Presidency of Bengal, scale 1 inch to 16 miles. Standard maps, scale 1 inch to 1 mile: Berar and Hyderabad, sheet 56 I 13; Bihar and Orissa, sheet 72 K 4 (preliminary edition); Burma, sheets 92 H 3, 93 E 5, 94 E 10, 94 I 5, 94 I 6, 94 I 9; Central India and United Provinces, sheet 54 N 2, 63 B 4; Punjab, sheet 43 H 7; Punjab and United Provinces, sheets 53 H 11, 53 H 12; United Provinces, sheets 53 H 13, 53 H 15, 53 H 16, 53 L 2, 53 L 3, 53 L 7, 53 L 8, 54 N 1, 63 B 8, 63 B 10, 63 B 14, 63 G 6 (preliminary edition), 63 G 10 (preliminary edition), 63 G 14 (preliminary edition). North-Eastern Frontier, scale 1 inch to 4 miles: sheet 83 K and O (15 N.E.) 4th edition. Calcutta: Map Record and Issue Office, 1912. *Presented by the Surveyor-General of India.*

Japan. **Imperial Geological Survey of Japan.**

Topographical Map. Division II. Scale 1 : 400,000 or 1 inch to to 6·3 stat. miles. 6 sheets. Topographical map. Division IV. Scale 1 : 400,000 or 1 inch to 6·3 stat. miles. Tokyo: Imperial Geological Survey, 1912. *Presented by the Imperial Geological Survey of Japan.*

Japan. **Imperial Geological Survey of Japan.**

Topographical map of Japan. Scale 1 : 200,000 or 1 inch to 3·1 stat. miles. Sheets: Hirado, Kiso, Nagasaki, Tsuruga. Tokyo: Imperial Geological Survey, 1912. *Presented by the Imperial Geological Survey of Japan.*

AFRICA.

Algeria. **Gouvernement Général de l'Algérie.**

Carte de l'Algérie. Dressée par ordre de Monsieur Lutaud, Gouverneur Général de l'Algérie, au Service Cartographique du Gouvernement Général de l'Algérie. Scale 1 : 200,000 or 1 inch to 3·2 stat. miles. Sheets: 12, Téniet-el-Had; 13, Boghari; 14, Bou-Saada. Algiers: Adolphe Jourdan, [1912]. *Price 1 fr. each sheet. Presented by the Gouvernement Général de l'Algérie.*

Algeria and Tunis. **Gouvernement Général de l'Algérie.**

Algérie, Tunisie. Dressé par ordre de M. Ch. Lutaud, Gouverneur Général de l'Algérie au Service Cartographique du Gouvernement Général sous la direction de M. de Flotte de Roquevaire. Scale 1 : 1,500,000 or 1 inch to 23·6 stat. miles. Algiers: Gouvernement Générale de l'Algerie, [1912]. *Presented by the Gouvernement Général de l'Algérie.*

Shows means of communication, the character of the railways, roads, and tracks being clearly indicated. The hill shading is too dark and to some extent obliterates the map, rendering it difficult to read the names.

Egypt. **Survey Department.**

Topographical map of Egypt. Scale 1 : 10,000 or 6·3 inches to 1 stat. mile. Sheets: N.E., 12–11, 13–10, 13–14, 14–10, 14–11, 15–10, 15–16, 16–12, 16–14, 17–12, 17–13, 26–7, 27–7, 27–8, 27–9, 28–8, 29–8, 29–9; N.W., 17–6, 18–6, 19–9, 19–12, 20–7, 20–8, 20–9, 20–10, 20–11, 21–7, 21–8, 21–9, 21–11, 21–12, 21–13, 21–15, 22–7, 22–8, 22–11, 22–13, 22–18, 23–8, 23–9, 23–16, 24–7, 24–8, 24–9, 25–6, 25–10, 25–11, 25–13, 26–7, 26–8, 26–10, 26–12, 26–13, 27–6, 27–7, 27–8, 27–9, 27–10, 27–20, 28–7, 28–8, 28–9, 28–10, 29–9, 30–6, 30–9, 30–12, 32–13. Cairo: Survey Department, 1912. *Presented by the Director-General, Egyptian Survey Department.*

North Africa. **Charlet.**

Confins Algéro-Tripolitains. Par le Capitaine Charlet. Scale 1 : 1,000,000 or 1 inch to 15·8 stat. miles. 2 sheets. Algiers: Service Cartographique du Gouvernement Général de l'Algérie, 1912. *Presented by the Gouvernement Général de l'Algérie.*

The region of the Sahara included in this map extends from 23° 30′ to 30° 30 N. lat., and from 8° 20′ to 14° 24′ E. long. It is evidently a provisional production somewhat roughly drawn, but exhibits the result of the latest surveys in the region.

Pemba Island. **Geographical Section, General Staff.**

Pemba Island. Scale 1 : 63,360 or 1 inch to 1 stat. mile. 2 sheets. Drawn and printed at the Ordnance Survey Office, Southampton, and published by the Geographical Section, General Staff, War Office, 1913. London agents: Edward Stanford, Ltd.; Sifton, Praed & Co.; T. Fisher Unwin. *Price 1s. 6d. each sheet. Presented by the Director of Military Operations, War Office.*

This is the first attempt at a regular survey of the island of Pemba, except for the Admiralty chart, which of course is chiefly concerned with the coast-line. The map is in two sheets, and is drawn from the surveys of Captain J. E. E. Craster, R.E., and Lieut. W. F. R. Kyngdon, R.A., in 1911–12. It is an excellent production, printed in colours, with contours at 50-feet vertical intervals. Care has been taken to indicate the character of the vegetation, and much other detailed information is given.

AMERICA.

Canada. **Department of the Interior, Ottawa.**

Atlas of Canada. Relief Map, Nos. 2 and 3, East and West sheets. Scale 1 : 6,336,000 or 1 inch to 100 stat. miles. Ottawa: Department of the Interior. *Presented by the Chief Geographer, Department of the Interior, Ottawa.*

A revised edition of the orographical maps which appeared in the Atlas of Canada (Nos. 2 and 3), showing relief in tints of buff and reddish-brown. The intervals in feet selected are 0–100, 100–500, 500–1000, 1000–2000, 2000–5000, 5000–10,000 and above 10,000. The available data is doubtless incomplete and approximate in many parts, but on the whole the result is very satisfactory, and the map gives an excellent general idea of the relief of the country.

Canada. **Dept. of the Interior, Ottawa.**

Sectional map of Canada. Scale 1 : 190,080 or 1 inch to 3 stat. miles. Sheets: 115, Blackfort, Alberta, revised to November 11, 1912; 171, Duck Mountain, Manitoba, revised to December 6, 1912; 265, Peace Hills, Alberta, revised to November 2, 1912; 365, Victoria, Alberta, revised to October 15, 1912; 368, Green Lake, Saskatchewan, revised to November 22, 1912; 464, Giroux, Alberta, revised to November 30, 1912. Ottawa: Dept. of the Interior, 1912. *Presented by the Department of the Interior, Topographical Surveys Branch, Ottawa.*

Canada—Quebec. **Dept. of Colonisation, Mines and Fisheries, Quebec.**

Map of Ungava Territory, Province of Quebec. Geologically coloured from explorations by A. P. Low and Robert Bell. Scale 1 : 2,217,600 or 1 inch to 35 stat. miles. Quebec: Department of Colonisation, Mines and Fisheries, 1912. *Presented by the Department of Colonisation, Mines and Fisheries, Quebec.*

Mexico. **Becerril.**

Carta General del Estado de México y del Distrito Federal. Formada con datos originales, levantamientos particulares de Ingenieros reputados, de Comisiones Oficiales y los propios por el Prof. Don Luis G. Becerril, Jefe del Departmento de Cartografia del Instituto Geologico N. Mexicano desde su fundación. Scale 1 : 300,000 or 1 inch to 4·7 stat. miles. Mexico, 1911.

A general map prepared from the latest official surveys, showing railways, roads, telegraphs, distribution of minerals, and other information. It is somewhat roughly executed, and relief is only shown by shading instead of contours, which would have been preferable even if in places they could only have been approximate. A few heights are given in figures. A list of latitudes and longitudes of six places is given in tabular form.

Panama. **Gray.**

Gray's Aero View of the Panama Canal, modelled by C. P. Gray. Horizontal scale 1 : 52,000 or 1·2 inch to 1 mile; vertical scale 1 : 13,000 or 4·8 inches to 1 mile. New York: C. P. Gray. [1912.] *Presented by C. P. Gray, Esq.*

United States. **Bacon.**

Bacon's Excelsior Map of the United States (Contour Edition). Scale 1 : 3,200,000 or 1 inch to 50·5 stat. miles. 4 sheets. London: G. W. Bacon & Co., Ltd. Boston: J. L. Hammett Company, [1913]. *Price, mounted on rollers and varnished, 16s. Presented by the Publishers.*

A clearly executed general wall map, showing heights of land and depths of water on the tinted layer system. For the land the contours in feet are as follows:—Below sea-level, sea-level to 100; 100–500, 500–1000, 1000–2000, 2000–5000, 5000–8000, 8000–11,000. On the water the intervals are 0–200 metres, 200–2000 metres, and below 2000 metres.

GENERAL.

World. **Bartholomew.**

The Physical and Political School Atlas. By J. G. Bartholomew, LL.D., F.R.G.S., London: Oxford University Press, 1913. *Price 1s. net. Presented by the Publishers.*

A cheap school atlas consisting of thirty-two large octavo pages of coloured maps, preceded by thirteen pages of black-and-white maps and diagrams with text. Many of the former maps are in pairs, one showing general relief by tinting, and the other the political divisions, while among the latter are astronomical diagrams, illustrations of different projections, types of geographical features, and diagrams showing relative sizes of cities, etc., such as are frequently given in such atlases.

World. **Bartholomew.**

Atlas of the World. By J. Bartholomew, F.R.G.S. London: T. C. and E. C. Jack, 1913. *Price 6d. Presented by the Publishers.*

A small pocket atlas containing fifty-six pages of politically coloured general maps.

World. **Hack.**

Philips' Geo-graph Book. A geographical observation note-book for astronomical and other records. By J. H. Hack, M.A. Cantab. Part I. London: George Philip & Son, Ltd., [1913]. *Price 3d. Presented by the Publisher.*

The Geo-graph Book resembles in appearance a school exercise book, and consists of thirty-two pages suitably ruled for plotting the graphs of various interesting and instructive observations connected with astronomical geography and meteorology, such as can

be observed in any school provided with a wind-vane, barometer, thermometer, rain-gauge, and cheap theodolite or clinometer. There are pages for recording wind for the year, weather phenomena for the month, observations of the moon, temperature, sun's altitude at noon, hours of daylight, and other phenomena which it would interest many an intelligent scholar to fill in, and teach him much at the same time. Blank pages are also provided for writing notes on the various observations recorded.

World. **Philip.**

Philip's Visual Contour Atlas. Edited by George Philip, F.R.G.S. London: George Philip & Son, Ltd., [1913]. *Price 6d. net. Presented by the Publishers.*

Contains thirty-two sheets of coloured maps on equal area projections. The principal maps are in pairs, contour tinted for heights, and political; but, in addition to these, some useful little physical maps are given showing rainfall, isobars, isotherms, winds, and currents. An index to place-names appears at the end.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, from February 2 to March 1, 1913. *Presented by the Hydrographer, Admiralty.*

New Charts—No. 388, Islands in the South Atlantic ocean: The Rocas, Fernando Noronha, St. Paul rocks (Peñedo de San Pedro), Trinidad and Martin Vas islands, Trinidad island, Martin Vas islets, 2*s*. 947, Borneo, Labuan island: Victoria harbour, 2*s*. 2112, Borneo: Ambong bay to Sampanmangio point, 3*s*. 2678, China: Yang tse kiang (sheet 2), Nanking to Tung liu (Plan: Nanking anchorage), 3*s*. **New Editions**—Index charts, A to V, 1*s*. *each*. 1698, England south coast: Dover harbour, 3*s*. 1859, England, west coast: King road, 2*s*. 2475, Scotland, west coast: Ardnamurchan to Summer isles, 3*s*. 1607, England, east coast: River Thames entrance, North Foreland to the Nore, 4*s*. 1548, Ireland, west coast: River Shannon (sheet 3). Scarttery to Tarbert, 4*s*. 1541, Ireland, west coast: river Shannon (sheet 4). Tarbert to Foynes, 4*s*. 1528, Ireland, river Shannon: Tarbert road, 2*s*. 2366, Baltic sea: Arkona to Dievenow river (New plan of Sassnitz harbour on this sheet), 3*s*. 2370, Baltic sea: Brüster port to Memel (Plan: Port of Memel), 3*s*. 144, Mediterranean, Spain: Gibraltar, 2*s*. 1588, Mediterranean: Anchorages on the south coast of Spain—Torremolinos anchorage, Sabinilla anchorage, Estepona anchorage, Marbella anchorage. Almeria road, 3*s*. 150, Mediterranean, France: Marseilles, 3*s*. 1678, Newfoundland: Southern approach to Hare bay (Plan: Four and Little Islets harbours) Plan added: How harbour (Outard or Bustard bay), 3*s*. 762, West Indies: West India islands and Caribbean sea (Sheet 2), comprising the lesser Antilles and coasts of Venezuela and New Granada, from Gulf of Paria to Gulf of Darien, 3*s*. 763, West Indies: West India islands and Caribbean sea (Sheet 3), comprising the coast of Central America with the off-lying dangers extending to Jamaica, 3*s*. 2001 South America, east coast: Monte Video bay, Approach to Cibil dock (Plan added): Maldonado bay, 3*s*. 1713, Anchorages on the west coast of Africa: Dix cove, Elmina bay, Cape Coast Castle (Plan of Cape Three Points on this sheet erased), 2*s*. 3093, Anchorages on the west coast of Africa: Sekondi bay, entrance to the river Volta; Plan added: Cape Tree Points, 2*s*. 51, India, west coast: Gulf of Cambay, 3*s*. 2062, China sea: Tong king gulf; Plan added: Namwan bay, 3*s*. 2400, China, east coast: The bar and approaches to the river Min (Plan: Kinpai pass), 3*s*. 1670*b*, Australia, east coast: Brisbane river, southern portion, 3*s*. 1674, Australia, east coast: Brisbane river, 4*s*. 2546, New Zealand, North island: Waitemata river from Kauri point, Auckland harbour, to its sources, 3*s*. 786, Pacific ocean: Cape Horn to Cape Corrientes, Mexico, and extending to 110° west longitude, 4*s*. 981, Pacific ocean, Caroline islands: Seniavina islands (Plan: Lot haven): New plans of Port Metalanim and Ponape haven on this sheet, 3*s*. 97, Pacific ocean: Anchorages in the Solomon islands: Narovo island, Coughlan harbour, Selwyn bay, Mosquito anchorage, Rura islands anchorage, Maoraha island and anchorage; New plan of Barango harbour on this sheet, 2*s*. 1378, Pacific ocean, Sandwich islands: Honolulu harbour, 2*s*.

(*J. D. Potter, Agent.*)

Atlantic. **U.S. Hydrographic Office.**

Pilot chart of the North Atlantic Ocean, February, 1913; ditto, South Atlantic Ocean, March, April, and May, 1913. Washington: U.S. Hydrographic Office, 1913. *Presented by the U.S. Hydrographic Office.*

Atlantic. **U.S. Weather Bureau.**

Meteorological charts of the North Atlantic Ocean, March and April, 1913; ditto, South Atlantic, March, April, and May, 1913. Washington: Department of Agriculture, U.S. Weather Bureau, 1913. *Presented by the U.S. Weather Bureau.*

Atlantic, North, and Mediterranean. **Meteorological Office.**

Monthly Meteorological charts of the North Atlantic and Mediterranean, March, 1913. London: Meteorological Office, 1913. *Price 6d. each. Presented by the Meteorological Office.*

Indian Ocean. **Kaiserliche Marine, Deutsche Seewarte.**

Atlas der Meeresströmungen in dem Indischen Ozean. Auf Grund der Beobachtungen deutscher und holländischer Schiffe bearbeitet und herausgegeben von der Deutschen Seewarte. Hamburg: L. Friederichsen & Co., 1913. *Price 15m. Presented by the Kaiserliche Marine, Deutsche Seewarte.*

Indian Ocean. **Meteorological Office.**

Monthly meteorological charts of the Indian Ocean, March, 1913. London: Meteorological Office, 1913. *Price 6d. each. Presented by the Meteorological Office.*

Indian Ocean. **U.S. Hydrographic Office.**

Pilot charts of the Indian Ocean, March and April, 1913. Washington: U.S. Hydrographic Office, 1910. *Presented by the U.S. Hydrographic Office.*

Indian Ocean. **U.S. Weather Bureau.**

Meteorological charts of the Indian Ocean, March and April, 1913. Washington: Department of Agriculture, U.S. Weather Bureau, 1913. *Presented by the U.S. Weather Bureau.*

North America—Great Lakes. **U.S. Weather Bureau.**

Meteorological charts of the Great Lakes, March and April, 1913. Washington: Department of Agriculture, U.S. Weather Bureau, 1913. *Presented by the U.S. Weather Bureau.*

Norway. **Norges Geografiske Opmaaling.**

Kystkarter. Bilag til 73, Svolvær Havn, scale 1:12,500 or 5 inches to 1 stat. mile; Bilag til 206, Aakre og Matrefjord, scale 1:100,000 or 1 inch to 1·6 stat. mile. Christiania: Norges Geografiske Opmaaling, 1913. *Presented by the Norwegian Geographical Institute.*

Pacific. **U.S. Weather Bureau.**

Meteorological charts of the North Pacific Ocean, March and April, 1913; ditto, South Pacific Ocean, March, April, and May, 1913. Washington: Department of Agriculture, U.S. Weather Bureau, 1913. *Presented by the U.S. Weather Bureau.*

Pacific, North. **U.S. Hydrographic Office.**

Pilot chart of the North Pacific Ocean, April, 1913. Washington: U.S. Hydrographic Office, 1913. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

China and Korea. **Bishop.**

250 photographs of China and Korea, taken by the late Mrs. Bishop. *Presented by Miss E. M. C. Ker.*

This is a valuable set of photographs taken by the late Mrs. Bishop during her extensive travels in China and Korea in 1894 and 1899, accounts of which were published in the *Geographical Journal* and her books, 'The Yang-tze Valley and Beyond' and 'Korea and Her Neighbours.' They are carefully arranged in albums, and form an important addition to the Society's collection. The titles are as follow:—

(1) Tibetan Buddhist monks masked for a religious drama; (2) Three leper women at Hang-chou; (3) Students at Ning-po; (4) Roof of Imperial temple at Kuan Hsien; (5) The librarian of the Ting library, Hang-chou; (6) Fashionable tea-house on zigzag bridge, old Shanghai; (7) Student Interpreter college, Peking; (8) Mountain pass between Kuan Hsien and Tibet; (9) Ancient pagoda, Hang-chou; (10) Fashionable tea-house, Hang-chou; (11) Life-size figures in temple of 500 disciples of Buddha, Hang-chou; (12) Imperial library, Hang-chou; (13) Native, Hankow; (14) Tomb of West China kings, Hang-chou; (15) Ancient temple, Shao-hsing; (16) Approach to ancient temple at Shao-hsing; (17) Silk-reeling, Ning-po; (18) The Thousand Armed Kwanjou, with attendants; (19) The Buddhist god of thunder; (20) Church mission house, Shao-hsing; (21) Style of tombstone in south China; (22) Bamboo village on

Min river; (23) Gate of Victory, Mukden; (24 and 25) Temple of God of Literature; (26) The Tablet of Confucius; (27) A Sŭ-chuan market village; (28) A dog-faced woman in gala head-dress; (29) C.I.M. "living-room." Sui Fu; (30) Group; (31) House and bridge on mountain pass in Sŭ-chuan; (32) Medical mission buildings, Swatow; (33) Kiu-kiang; (34) Kuei-chou Fu, upper Yang-tze; (35) Shintan gorge, Yang-tze; (36) Medical students, Mukden hospital; (37) Fort on wall of Tartar city, Peking; (38) Sikh and Chinese police, Hankow; (39) Barrowmen, Cheng-tu plain; (40) Bridge at Mien-chou; (41) Country bridge in Sŭ-chuan; (42) Yang-tze bank at Wan Hsien; (43) Boat used for descending the Min rapids; (44) Mrs. Bishop's arrival at a Chinese inn; (45) Minaret at Shao-hsing; (46) Mrs. Bishop's boat on Min river; (47) Rock of pilgrimage on Yang-tze; (48) Four divinities in temple; (49) Dr. Christie's Manchurian servants; (50) Sculptured lion; (51) A street completely depopulated by the plague at Hongkong; (52) Hien Mien gate, Peking; (53) Gate and walls of anti-foreign town near Chi-fu; (54) A Sŭ-chuan, Chatsworth; (55) Bed of the Yang-tze at low water; (56) Farmhouse in Hakka country; (57) Porcelain-fronted temple on the Yang-tze; (58) Entrance to British Legation, Peking; (59) Mrs. Bishop's houseboat on the Yang-tze; (60) Junks at Fu-chou; (61) Municipal temple, Shanghai; (62 and 63) Buddhist temple, Chi Fu; (64) Imperial stone road from Peking to Ch'êng-tu Fu; (65) Fishing fleet at Ting-hai T'ing, Chusan archipelago; (66) Oldest form of mill, Ch'êng-tu Fu plain; (67) Greengrocer's shop; (68) Chinese soldiers, Hang-chou; (69) The goddess of mercy at a wayside shrine, upper Min river; (70) C.I.M. house, Wan Hsien; (71) Bridge and temples; (72) Farmhouse in Sŭ-chuan; (73) Wall and gate towers in Ch'ungch'ing Fu; (74) Gorge on the Yang-tze; (75) Scene on the upper Min river; (76) Native Hankow; (77) Temple of Confucius, Shao-hsing; (78) Bottle-selling in courtyard of Swatow hospital; (79) Gatekeeper at C.I.M. house, Sui Fu; (80) Mrs. Bishop's boat's crew at dinner; (81) Judgment seat of the Tsu-su of Somo; (82) Temple, Mukden; (83) Great gate of Peking; (84) Imperial temple, Kuan Hsien; (85) Courtyard of C.I.M. station at Sintientze; (86) Buddhist monastery, Mantzu country; (87) Mantzu village, upper Min river; (88) Rev. H. Horsburgh; (89) Native town, Hankow; (90) Wan Hsien beach, Yang-tze; (91) Imperial road between Peking and Ch'êng-tu Fu; (92) Lupus victim, Hang-chou; (93) Street in Canton; (94) On the upper Min river; (95) A stone lion; (96) Opium culture; (97) Shinton on the Yang-tze; (98) Guest hall of C.I.M. house, Wan Hsien; (99) Trackers' hovels, Yang-tze; (100) Baby tower, Fu-chou; (101) Frescoes in Buddhist temple; (102 and 103) Dora Bird memorial hospital; (104) Mrs. Bishop's party at Korean inn; (105) Korean school, Gensen; (106) Mrs. Bishop's travelling party; (107) Halt at spirit shrine; (108) Queen's pavilion, Eastern palace, Seoul; (109) Hall of Congratulations, Western palace, Seoul; (110) Stone figure at Royal tomb; (111) Marble Buddha, Seoul; (112) Monks; (113) South gate, Seoul; (114 and 115) Altar at tomb of Ki Tze, Phyong-yang; (116) Mr. Hillier receiving complimentary umbrella from Chinese guilds, Seoul; (117) At a Korean inn; (118) Korean labourer; (119, 120, and 126) Korean gentlemen; (121) The river port of Seoul; (122) Phyong-yang; (123) In the Diamond mountain region; (124) Korean village; (125) Korean villagers; (127) A street in Seoul; (128) On the Han river; (129) Frescoes in temple of God of War outside the south gate of Seoul; (130) Pailow on Peking road; (131) A royal tomb; (132) Little east gate, Seoul; (133) Customs House, Seoul; (134) Mr. Hillier outside a Korean inn; (135) Ruins of ancient royal palace, Song-do; (136) Phyong-yang after the war; (137) Wen-san; (138) Bull with bush wood, Seoul; (139) Bull with faggots, Seoul; (140) Song-do; (141) A wayside inn; (142) Gate of Yamen, Song-do; (143) upper Tai-dong; (144 and 145) Cadet corps and Russian drill instructors, Seoul; (146) Royal library, Western palace, Seoul; (147) Royal library, Eastern palace, Seoul; (148) Survivors from the Kawshing; (149) Pavilion in grounds of Eastern palace, Seoul.

General. **Schnaider and others.**

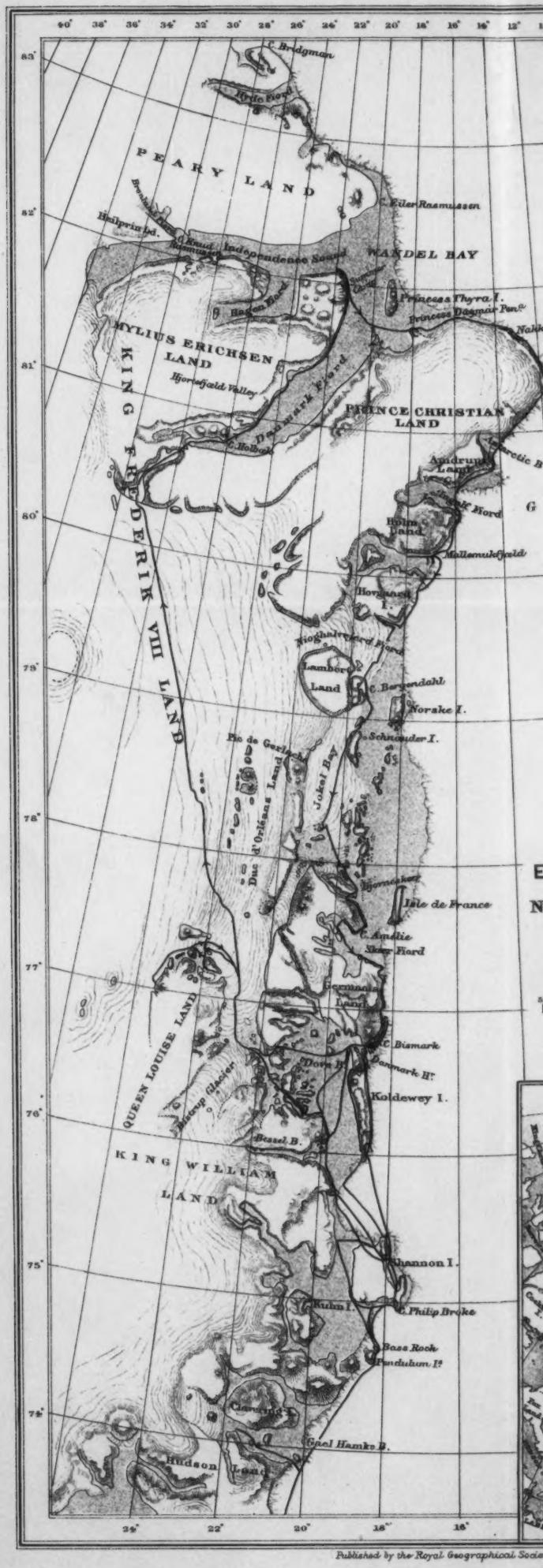
172 photographs of Asia, Africa, South America, and the Canary Islands, taken by Walter L. Schnaider, Esq., and others. 1907–10. *Presented by Walter L. Schnaider, Esq.*

As will be seen from the title, these photographs cover a wide range of countries and subjects. They are of various sizes, but most of them measure 5 inches by 6½ inches. Some of the subjects are of special interest.

Asia.—*Asiatic Turkey:* (1–3) Trebizond; (4) A Turkish "Araba"; (5) Scene along the Tigris; (6) Bridge across the Tigris at Baghdad; (7) Barracks at Goufas, Baghdad; (8) Tea-houses, Baghdad; (9) Tomb of Sheik Marouf; (10) Museyib; (11) Tram at Kufa; (12) Nejef; (13) Kerbela; (14) Mosque at Kerbela; (15) Ruins and carvings at Babylon; (16 and 17) Busra; (18) Ruins near Kangawar; (19) A Baghdad

Jewess; (20) Balconies of houses in Baghdad; (21 and 22) "Arabas" filled with native travellers; (23) German scientists excavating at Babylon; (24 and 25) British engineers and native workman at the dam at Tewarij; (26) My fellow-passengers down the Tigris river to Busra. *China:* (27) A Chinese sampan; (28) Graves near Shanghai. *India and Ceylon:* (29) Street scene, Bombay; (30) Street scene, Benares; (31) Interior of a Hindu temple; (32) The Burning Ghats of the Ganges; (33) Along the Ganges; (34) Shinahia ghat; (35) A million people bathing together on a festive day; (36) The Jama Masjid mosque, Delhi; (37) The annual prayer in the Jama Masjid mosque; (38) Gate leading into the fort at Delhi; (39) Gate leading into the fort at Agra; (40) Entrance to a Jain temple; (41) Gate leading into the city of Jaipur; (42) Small temples outside the gates near Jaipur; (43) Temple, Madura; (44) Canals in Ceylon, (45) Botanical gardens at Kandy; (46) Native actors in Ceylon. *Japan:* (47–49) Japanese temples; (50) Shooting the rapids in Japan. *Persia:* (51) Enzeli; (52) Ruins of a Persian home near Resht; (53) Russian officer and Persian cossacks guarding [illegible]avan route; (54) A Persian public school-house and a dancing boy; (55 and 56) [illegible]svin pass; (57) A [illegible]tain at Kasvin; (58) An old caravanserai near Teheran; (59) [illegible]et scene, Teheran; (60) The pearl cannon, Teheran; (61) Home and garden of a wealthy Persian, Teheran; (62) One of the seven gates leading into Teheran; (63) Mosque of Shah Abdul Azin; (64 and 65) Two of the late Shah's summer palaces outside Teheran; (66) Gate leading into Teheran; (67) The Shah's palace, Teheran; (68) Gate of Shah's zoological garden outside Teheran; (69) Gate of bazaar, Teheran; (70) Terminus of Teheran railway; (71) Bas-relief near the ancient city of Rei; (72) Monument near Rei; (73) Children of the soil; (74) The ungrateful Persian soil; (75) "The Twentieth Century Express, Limited," of Persia; (76) A tollgate along the road, built by Lynch & Co., leading from Teheran to Hermanshah; (77) Persian types; (78) Bridge leading into Kum; (79) A Persian "Tchai Khane"; (80) Scene at Kum; (81) Wind towers; (82) Mosque of Fatmah at Kum; (83 and 84) Slaughtering a goat at a "Tchai Khane"; (85) The nomads and their black tents; (86–89) Ilyats migrating; (90) A part of my caravan after leaving Kermanshah; (91) A caravanserai; (92) Kurdish dancing girls; (93 and 94) Military escort across "No Man's Land"; (95) Copy of the answer from the High Priest to a pamphlet declaring that a country's constitution has nothing to do with its religion; (96) Hotel at Kasvin; (97–100) Persian people; (101–103) Road built by Lynch & Co., from Kum to Kermanshah; (104) A relay of horses; (105–107) A native caravan; (108) Caravan resting; (109) Children of wealthy Persian families; (110) Persian workman; (111) A native camel caravan; (112) A Persian home; (113) Gate leading into Kum; (114) A Persian garden; (115) High priest hung in the public square at Teheran by revolutionists. *Siam:* (116) A garden and monastery in Bangkok; (117) Temples of Siam; (118) Interior of temple; (119) A Siamese railway; (120 and 121) Ayuthia; (122) Natives; (123 and 124) Corralling wild elephants by means of domesticated ones; (125) Penal colony. **Africa**—*Algeria:* (126) *En route* for Biskra. *East Africa Protectorate:* (127) Port of Mombasa; (128) Fish and firewood market, Mombasa; (129) Native quarters, Mombasa; (130) Portable scaffolds for public executions near Mombasa; (131) Victoria Nyanza; (132) Swahili women; (133) A feat of balance by a Swahili woman; (134) Native girl grinding corn; (135) Poultry woman; (136 and 137) Masai women; (138) A Masai warrior; (139) Medicine man; (140) Market, Port Florence; (141) A spear-maker; (142) Village; (143) A native family. *Egypt:* (144) The Nilometer near Rhoda island; (145) Pyramids; (146) Water-carriers; (147) Egyptian well; (148) A donkey-boy; (149) The Sphinx; (150) The Colossi of Memnon; (151) Caravan in a palm grove; (152) Temple of Luxor; (153) Temples at Karnak. *German East Africa:* (154) Dar-es-Salaam; (155) Street scene, Dar-es-Salaam; (156 and 157) Botanical gardens, Dar-es-Salaam; (158) German Government hospital; (159) Village near Dar-es-Salaam. *Rhodesia:* (160) Launch near Livingstone; (161) The Victoria falls. **South America**—*Brazil:* (162) The Iguassu falls. *Chili:* (163) Plaza in Santiago. *Canary Islands:* (164) Madeira; (165–168) Coast formation; (169 and 170) Matade valley; (171) Panorama of the highest peaks; (172) Las Palmas.

N.B.—It would greatly add to the value of the collection of Photographs which have been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.


PEARY LAND
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KING FREDERIK VIII LAND
QUEEN LOUISE LAND
KING WILLIAM LAND
PRINCE CHRISTIAN LAND
WANDEL BAY
Independence Sound
Hjortefjeld Valley
Dalrymple Rock
Princess Thyra I.
Princess Dagmar Pen.
Bessel B.
Hudson Land
Lambert Land
Isle de France
Koldewey I.
Shannon I.
Kuhn I.
Base Rock
Pendulum Is.
Cape Hawks B.
Norske I.
Schnauder I.
Hovgaard I.
Mallemukfjeld
Amdrup Land
Bismarck Hr.
Dove Bay
Joksel Bay
Dan d'Orléans Land
Bjornekaer
C. Amélie
Skjer Fiord
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C. Philip Broke
C. Bismark
C. Eiler Rasmussen
C. Bridgman
C. Holbœk
Brooklyn Land
Hailprin Bd.
Bjorn Bay
Denmark Fiord
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Publish by the Royal Geographical Socie

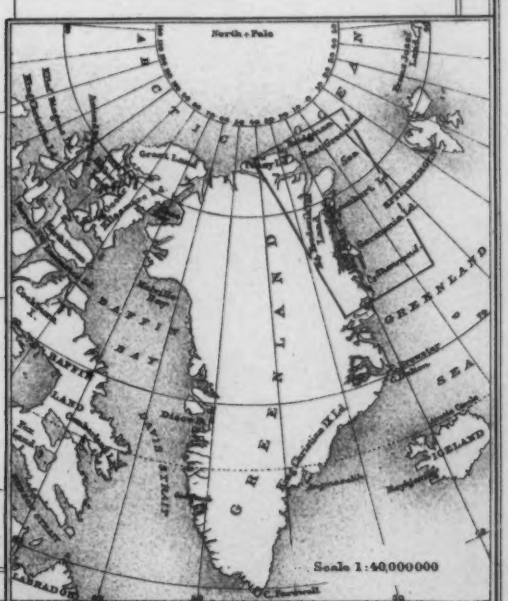
Sketch Map
to illustrate
EINAR MIKKELSEN'S EXPEDITION
to
NORTH EAST GREENLAND
1909-12.

Based upon the map of the Danish North East Greenland Expedition 1906-08, with corrections from sketches supplied by Einar Mikkelsen.

Scale 1:4,000,000 or 1 Inch = 63·12 Stat. Miles.

60 40 30 20 10 0 50 100

Route shown thus ———



Conical Projection with true meridians and arrorless parallels 50°N and 53°N

Published by the Royal Ge

95°
96°
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SOUTHE
Spring
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To Mu-li-Kho
To Guchen & Urumchi
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(Khumulik farms)
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Tou-shui
(Dabaga)
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Kichih Ulansa
3425
Dsham Bulak
Forest limit E.
BOGDO OLO
Ulang-oa
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Gashan Pass
Hui-shing-tzu
(Huram-tash)
Pass
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Hsi-yen-ch'ih (S.)
Yan-chu
Tash Bulak
Dying and dead
Poplar trees
Otun-Tsaza
or
Tung-yen-tzu
Tamarisk scrub
and few trees
Wolf and corral
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3232
High flat ridge
High rolling desert hills
Ur-otra-kela
T U R K
Sari-kamish
2430
Kosh-Bulak
Kurk-otun
To Turfan
Chiltum
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RUSSIAN TURKESTAN
MONGOLIA
DEUNGARIA
GOBI DESERT
TIBET
CHINA
INDIA
PERSIA
AFGHANISTAN
NEPAL
ALTYN TAGH
KUEN LUN
HIMALAYA MOUNTAINS
ARABIAN SEA
BAY OF BENGAL
CALCUTTA
BURMA
PEKING
LHASA
Yellow Sea
Yin-nan Fu

Published by the Royal Geographical Society.

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cultivation
Farms and cultivation
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Sumustan
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Kaldak Dawan
Bar-kul Dawan
Beju Pass
Tamir
Kaldak Karaul
Koral
Narin
Kalgat
Khuluga
Olan Bulak
Kdira
Tor-ak
river terraces
100 ft.
Kara-kapekin
Ruined tower
Stony desert
ruins
Ta-shar
5372
Salt plain
Scattered farms
KUMUL or HAMI
Karmukchi
(approx.)
Kara-tal
Kurik Gol
Hoang-lung-hang
To An-hsi
Bagdash
Tomu
TUR KU
Salt
6301
K A R L
94

95

44

KARLIK TAGH AND BARKUL MOUNTAINS

From a plane table survey by

DOUGLAS CARRUTHERS

ith material added from Sheet XXI of the map of the "Southern Frontier Regions of Asiatic Russia" and from Sir Aurel Stein's surveys of 1906-8.

Nat. Scale 1:500,000 or 1 Inch = 7·89 Stat. Miles.

10 5 0 10 20 Stat. Miles.

Reference.

te of Mess^rs Carruthers & Miller in 1911 — Other routes — Tracks — Pass

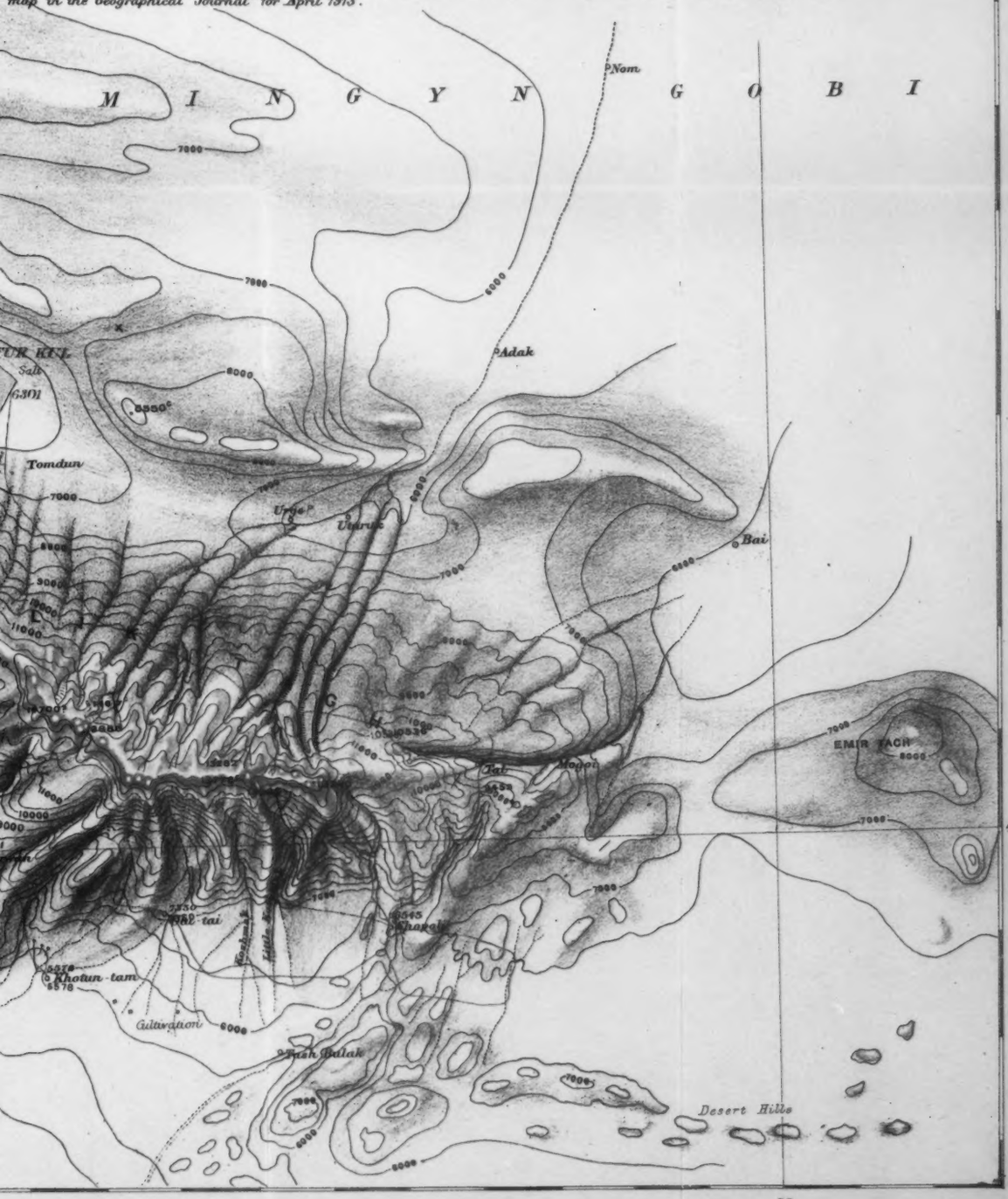
d — Sand Dunes — Springs — Marsh

ans — Dry Wadi — Perpetual Snow — Gorges

ns — Small Farms — Ruined Watch-towers — Ruined Shrines

ns — Mosque — Watering — Camp

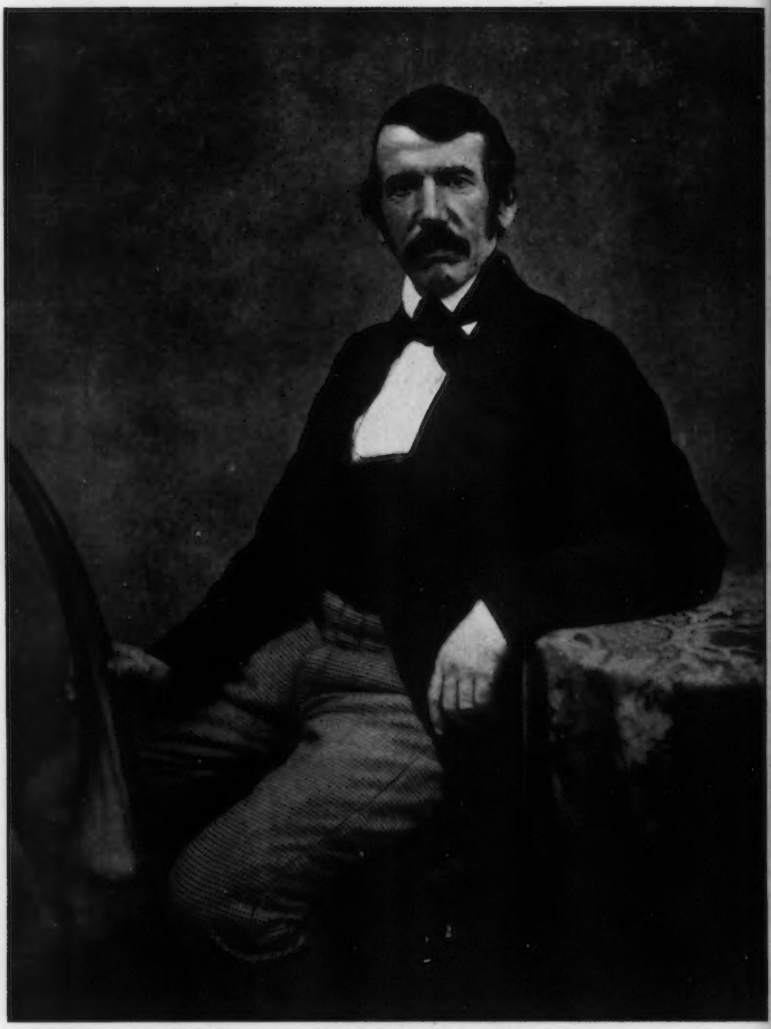
All heights, in feet, are from hypsometrical readings, except those shown thus 12068 which are from clinometer angles. Approximate contours at 500 feet intervals. For further information, see M^r Carruthers' note which accompanies the map in the "Geographical Journal" for April 1913.



43

95

THE KARLIK TAGH AND BARKUL MOUNTAINS
CARRUTHERS



DAVID LIVINGSTONE.